# POPULAR Only 40p. COLUMN ONLY 40 PORCE ONLY 40 PORCE ONLY 40 PORCE ONLY 40p. WEEKLY 25-31 October 1984

23-31 UCTODEF 1964

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Vol 3 No 43

# 128K Machine planned by CBM

COMMODORE is working on a new up-market home micro, intended as a direct competitor for the Sinclair QL.

The machine, called the C128, is based on the 8-bit 6803 processor with 128K Ram and a built-in disc drive.

Unlike the 68006 used in the QL which can address 128K of continuous memory, the 6502 can only address a maximum of 64K at on time. With the C128

Commodore gets around this problem by arranging the 128K in two 64K banks either of which can be switched in as required.

When the C128 is first turned on the machine behaves as an ordinary Commodore 64 and is fully compatible with existing C84 software. Hitting a function key swaps to the other 64K Ram giving access to Basic 3.5, the same version of Basic as that

offered on the new Plus/4 machine, and an 80-column display.

The C128 is likely to be previewed at the fanuary Consumer Electronics Show in Las Vegas.

Also included in Econet software and the word-processor

# Acorn's ABC prices

ACORN'S new ABC range of microcomputers, previewed at this year's Personal Computer World Show, will kick-off at £700, rising to £4,000 for the top-of-the-range machine.

For £700 you get the Personal Assistant, technically similar to a BBC machine with a built-in 12 inch black-and-white monitor and single 640K disc drive. Also included is Econet software and the word-processor

continued on page 51

# Frankie steps in

FRANKIE Goes to Hollywood, the top selling pop group with records like Relax and Two Tribes, are to have a computer program written for them by Ocean Software.

According to Ocean's software development manager the Frankie program is currently at an adanced stage of development: "It will take the form of an arcade-style game featuring members of the band as characters within it," he said.

A spokesman for Frankie

Goes to Hollywood's record company ZTT refused, however, to confirm the existence of the Frankie computer game: "We have nothing to say to your magazine, whatsoever," he said.

Ocean has in the past been involved in a number of joint ventures linking well-known figures to computer games, most notably Daley Thompson for Daley Thompson's Decathlon.

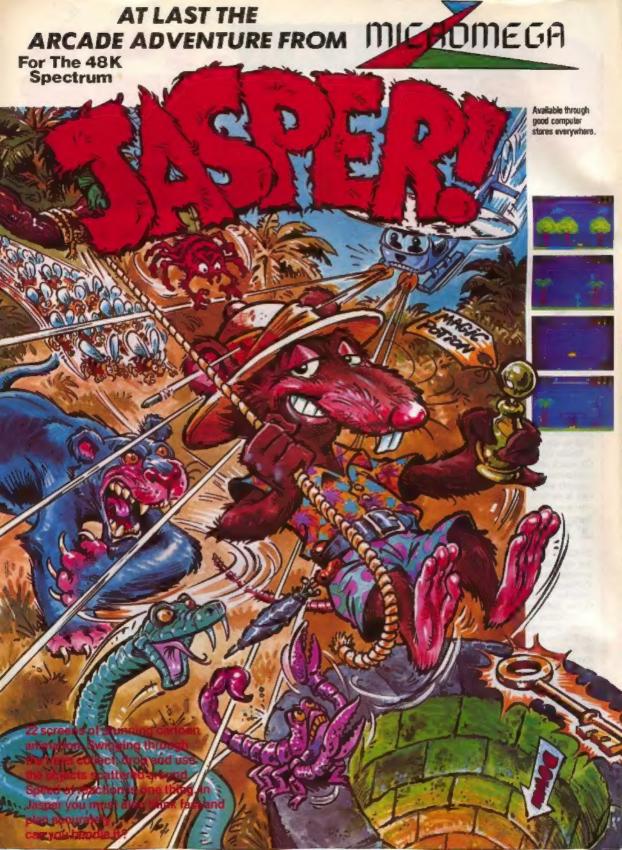
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SPECTRUM+REVIEWED

INSIDE

13 FREE ZX FAIR TICKETS ) AMSTRAD DRAW



# **View**

The top home computer manufacturers seem to have lost confidence in their ability to continue to innovate, whilst at the same time staying on top of the heap.

Last week Sinclair announced its Spectrum+ to use the wealth of Spectrum software and hopefully get at those people thinking of buying an Electron, Commodore M or Atmos. Clever as a marketing ploy but nothing more.

And there is Commodore's C128 which takes bits and bobs from the Commodore 64 and the Phys/4, adds in a disc drive, to get an interesting bundling inch.

But it is almost as though both companies are treading water. Sinclair has been at a loss to understand why the QL's microdrives have not been welcomed with open arms and it is taking a long time for UK software houses to come to grips with the 68008. Commodore on the other hand doesn't seem confident that the Plus/4 will 'knock 'em dead'. Commodore UK's manager Howard Stanworth even warned journalists at the Plus/4 launch against prejudging the machine by adverse press reaction in the US.

So both companies are being cautious. Making the most of their respective software strengths and working out what to do next.

With MSX around the corner, launching a 16-bit home micro may be a necessary — but very risky — gamble for Sinclair.

For Commodore, which has yet to offer a 16-bit machine, the dilemma is all the greater.

The problem is that there is no such thing as a good time to launch a machine which is incompatible with your existing base of software.

If he can continue to sort the company out, watch out for something daring next year from Jack Tramiel's new-style Atari.

# POPULAR VOI 3 No 43 WEEKLY

Presents...

News > Your computer show cancelled

Streetlife > Graham Taylor visits the Micro Training Programme

Star Game > Round and round the garden in Cattapillar for the BBC B and Electron by Colin James

Machine Review > Sinclair's new Spectrum+ — plus keyboard, plus software, minus invention?

Giveaway > 250 free tickets to the November ZX Microfair up for grabs to Spectrum and QL owners.

Software Reviews > Eighth Day's Faerie 25 > The Prince from CCS

Spectrum > New machine-code screen print routine by Stuart Nicholls

Amstrad > Brian and David Lewis bring you on-screen drawing with Scribble 35

**BBC and Electron** > Twinkle, twinkle little star . . . I wonder what magnitude you are. Programming on the Electron.

The QL Page > Breath out . . . here's Part Two of Keith Poole's Disassembler program.

Commodore 64 > Some light relief . . . zap away in Land of the Giants by Steve Philips

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Dierim sout I'm Brymalkin, he cont m to help you. Or assh to got out of the toward but we might be send a somment fort.

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# Futures...

Vic20 Star Game > GST's alternative QL operating system > structured listings on the 64 > and Doodle on Spectrum.

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Computer Trade Association Magazine of the Year

25-31 OCTOBER 1984

3



# How to teach your Micro a thing or two

Thousands of home computer owners have yet to discover their microcomputer's potential to help with many of the problems and decisions that come up every day in the home or office.

Perhaps you have always promised yourself that you would teach yourself programming, but have been put off by manuals which seem to assume a lifetime spent studying computer science and mathematics. Maybe you have looked at other computer books, but have yet to find one which is free of unnecessary jargon or where the program examples bear some relevance to real life and not space invaders.

Relax, your search is over.

The 'Learn BASIC' tutorials from Logic 3 are the latest development of a teaching method pioneered by Professor Andrew Colin and perfected by testing on 3 generations of students at Strathclyde University. The 'Strathclyde Method' has been translated into 8 languages and used by over 300,000 microcomputer users.

'Learn BASIC' is a jargon free, step by step, course in computer programming, which explains everything clearly in English, not computer talk. In a matter of hours you will be writing your first programs.

'Learn BASIC' is designed for people who want to keep abreast of the computer age, for people who realise that understanding computers is a key to future success at work, at school, and as a parent.

Get 'Learn BASIC' and teach your micro how to be useful! (Available from major branches of W.H.Smiths, Boots, Laskys, Greens, John Menzies and better computer shops nationwide.)

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# **Dragon games row**

A ROW has broken out between Dragon software house Impsoft and Touche Ross, solicitors acting as receiver for the failed micro manufacturer Dragon Data.

Touche Ross is refusing to pay the company any royalties on Impsoft's Fruity title originated by Dragon Data and now being sold by Touchmaster.

Touchmaster — the new company formed by former Dragon chiefs Brian Moore and

Christmas micro show scrapped

THE YOUR Computer Christmas Computer Pair has been cancelled.

The fair was to have been held at Olympia on November 30-31.

"We felt that the day of the computer show as an enduser's buying extravaganza are over," explained a spokesman for the magazine sponsoring the show, Your Computer.

"No doubt it would have been attended by large numbers of people but it probably wouldn't have made money for the software houses attending," he added.

Thirty-eight companies had booked to attend the show when the decision in cancel was made but, of the major microcomputer manufacturers—Sinclair, Commodore,

Acorn, Oric, the MSX companies and Amstrad — only the latter had agreed to exhibit.

#### ABC prices

continued from page 1

and spreadsheet packages View and Viewsheet. The Personal Assistant is fully expandable to the top of the ABC range.

The £700 tag will make the Personal Assistant attractive to anyone considering assembiling a similar system around a BBC machine.

The flagship of the new range—the ABC310—will sell for £4,000 with a colour monitor and additional 80286 IBM-compatible second processor, 10M hard disc and a selection of bundled software.

Richard Wadman after the Dragon collapse — purchased quantities of Dragon Data software from receivers Touche Ross which it is now selling off at a hefty discount.

"Yet we will see no royalty payment from our title because Touche Ross is claiming that the software sold to Touchmaster was 'distressed stock'. Our Fruity title which retailed under Dragon Data for £7.95 is now being sold off for £3.95," explained Impsoft's Norman Silver.

"We have instructed our solicitors to clarify our position and we intend to pursue the matter vigorously."

# Software movies now from the US

THE IDEA of linking a computer program to an audio tape, first seen in this country with Automata's Deus Ex Machina.



is being developed by a number of companies.

Unlike the Automata pro-

# Big-name tape deal

A NEW company, Computer Records has released two impressive software compilation tapes

Each of the two tapes - one for the 46K Spectrum and one for the Commodore 64 contains twelve titles and will retail for £12.99

The two compilation tapes are as follows.

Spectrum: Hunchback, Mr Wimpy and Transversion from

# More budget games titles

SOFTWARE Projects — home of Miner Willy — has launched a range of budget-priced software titles under the label Software Super Savers.

Eight titles have so far been announced — all priced at £2.99 — for the Spectrum 48K,



the commodore 64 and the 8K-expanded Vic20. They are: Flip Flap, Moonlighter, Shuttle Shock, Ziggurat and Fred's Fan Factory on the Spectrum; California Gold Rush and Faces of Haarne on the Commodore 64 and Revenge of the Quadra on the Vic20.

Ocean; Space Intruders, Meteor Storm and Time Gate from Quicksilva; Kong, Missile Defence, and Moonbuggy from Anirog; Pool and Spectres from Bug-Byte; and Dennis Through the Drinking Glass from Applications.

Commodore 64: Hunchback and Mr Wimpy from Ocean; Galazy, Kong, Hexpert, Skramble, Moon Buggy, Cosmic Commando and Star Base Defence from Anirog; Ring of Power and Purple Turtles from Quicksilva and Dennis Through the Drinking Glass.

Computer Records in an associate company of Telstar Re-

#### Pirates get organised

GAMES software houses in the UK now believe that European commercial software pirates are becoming organised.

An International Cracking Agency is now apparently operating, based in Holland, the purpose of which is to circulate recognised software pirates with a 'cracking' disc of software and know-how designed to get round most commercial program protection techniques currently being used.

International organised piracy is now a widespread and serious problem: "It's getting so bad that you can't release a new title slowly through Europe — two weeks after the program is launched in the UK, pirated copies are available in

gram, most of the other packages are designed for the educational market where the audio tape contains a spoken commentary on the computer pictures and invites children to answer questions.

American software house Maximus has produced Software Movies aimed all the four to eight age range. The packages, for the Commodore 64 consist of program disc and audio tape. After the program is loaded the tape is played and linked to the computer by pressing the space bar.

Speech on the audio track is matched to the lip movement of a cat called Max.

A Kenilworth-based company, Softlee Systems, is using a similar system on its range of Spectrum educational soltware. Its three programs. A Day at the Seaside, A Picnic in the Park, and Jo Visits the Farm, all teach simple spelling by associating simple spoken words with pictures. Computer and hi-fi or headphones are linked via a simple lead. This system uses the spare channel on the stereo cassette tape to carry the spoken words but requires the child to stop and start the tape between questions. The price for the tapes is £9.75 each with the lead costing £1.95. More details from Softlee Systems, Freepost, Kenilworth, Warwickshire.

The Maximus Software Movies are not yet available in this country, but the company can be contacted at 6723 Whittier Avenue, McLean, Virginia 22121, USA.

a number of other countries and you haven't got any market left," commented CRL's Clament Chambers.

"If we could find out who is behind this International Cracking Agency they'd be in the Thames with a set of concrete wellies," he added.

#### **PCS** folds

PCS — at one time the largest UK software distributor — folded last week.

The collapse, emphasising the depth of the summer slump in the industry, will not make life easier for many of the troubled software houses. PCS still owes over £60.000 mainly to software companies who will now have little hope of recovering the money.

# **ATTENTION! ATTENTION! ALL COMMODORE USERS**

# A FREE LIGHTPEN

Yes a FREE Light Penl with every GRAPHKIT? Graphkit is the ultimate in drawing!, designing! or painting! lusing the light pen of course, which incidentally has a full 3 year warranty!) Graphkit will amongst other things allow you to:

 Draw free handed on the screen anything from a Micky Mouse to your latest integrated circuit!
 With all the fill colour and erase facilities of course!

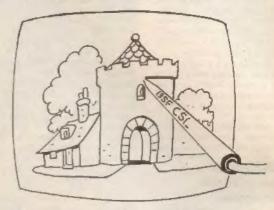
Save/load your latest master place to/from the disk/tape drive

 Or directly copy the drawing on the screen to the printer! And keep it for ever or send to a friend as a post card!

Design your own colourful sprites and characters
 Play the games in the package! or use the light pen

in your own games/education/programs

**GRAPHKIT** is available on disk and tape. Tape version is £1595 and disk version (recommended) is £19.95.



All you 1540/1541 disk users DMONI is here at last. Dmon is the disk monitor you have been waiting for it will allow you to:

• read/write blocks from/to the disk

display and edit blocks on the screen

display and send disk messages/commands

● transfer your programs from tape to disk or disk to disk or even disk to tape! ● and more!

DMON comes on DISK at only £9.95.

Do you use tapes? Are you sick and tired all waiting for your programs to be Loaded/Saved from/on the tape? Then you need a TORNADO!! Tornado allows you to Save/Load/Verify your Basic/machine code programs faster than a CBM 1541 disk drive does! Due to popular demand! Tornado now comes with new and more powerful commands plus extrainstructions to assist you in making fast versions of your existing machine code/Basic programs. Tornado is available on tape for CBM 64 and 8K + Vic 20.

Do your Run/Stop and Restore keys often fail? Do you want to come out of those crashes?! Or get into those unbreakable programs?! Then what are you waiting for, get yourself # BREAKER!! Reset switch and let your computer know who is the boss!! Breaker can be connected to your machine in seconds, no soldering. Included with the Breaker is a copy of basic recovery software on tape. Now available for any CBM 64 or Vic 20.



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# **Amstrad** interest

It is good to see in your pages a little more interest in the Amstrad CPC464 — the only machine capable of preventing a love-hate affair between me and a QL.

P J Long's reporting of the Mod function (Letters, October 4 issue) enables a much simplified prime-finding routine:

10 CLS
20 FOR n=3 TO 1000 STEP 3
30 FOR m=3 TO SQR (n) STEP 2
40 z = n MOD m
50 IF z=0 THEN GO TO 80
60 NEXT m
70 PRINT n

80 NEXT n

The For-To limits in Line 10 can of course be altered to give other ranges, but it should start with an odd number. The program tests for primes at the rate of about 14 odd-numbers per second. It is easily modified to test the various prime-finding formulae which have been proposed from time to time.

And now, back to my dongle-less CP464.

R j Peter
Fitzherbert Street
Warsop
nr Mansfield
Notts

# Editing system

I was interested to read in one of your September issues of a way of using the QL Quill word processor to write and edit SuperBasic programs using a utility program written by Richard Snowdon.

There is in fact another way of doing this which requires no special utility program, and which uses the *Quill Print* option to print to a file.

Several things have to be set up before this system works effectively.

The first thing that must be done is for the printer characteristics to be altered by running mdv1 install bas and setting the following parameters:

End of line code :<LF>
End of page code :<LF>
Preamble code :1, R.E.M
This provides the correct

line terminator for SuperBasic.

and puts a preamble on the front of the file which actually gets lost when the SuperBasic program is loaded. If the preamble is not included, you lose the first line of your program.

The second thing is that when editing of an imported SuperBasic test is started, the Design option of Quill should be entered and the following parameters set:

Bottom margin	0
Gaps between lines	0.
Page size	0
Start page	1
Upper margin	0

This ensures that no paging characters are sent to the printer file, and that page delimiters do not appear on screen while editing.

When this is complete, and the text is left-justified (the default condition), a loadable SuperBasic program is generated by Printing current, whole, not to printer but to xxxx bas where xxxx bas is the file to be created on mdv2. If the file already exists, Quill will ask if you wish to overwrite it.

The SuperBasic program mdv2\_xxxx\_bas can then be loaded and run in the usual way.

I use this system of editing on my PM version QL.

The system is fairly slow, given that Quill takes a long time to load itself, and a long time to Save and Print text, and even longer to import a Super-Basic program. The best procedure seems to be to always edit using Quill and Save the text at the end of each editing session, periodically printing to produce a file that can be loaded and run, and to not edit the file using the ordinary



SuperBasic facilities so as to avoid the need to import the file back into Ouill.

Chris Davis Bristol BS8

#### Spectrum network

A fter reading B Comill's Comill's Commile QL page called Quantum mechanics in the August 23 issue I wondered with you could not modify this program to utilise the net on the Spectrum and QL, instead of cutting up the RS232 printer cables (even if it was a free gift from Sinclair).

By changing lines 10, 20 and 26 in the Spectrum program to:

10 Format "n : 10
20 Open #6; "n : 6
28 Let A\$ = Inkeys #6
type in as a direct command to
the QL:—
Net S
Open #6, Net 0-10
List #6

I called the Spectrum network station 10, and the QL network station 6— the above modifications worked with my JM Rom and produced QL listings on the ZX printer — does anyone know if the Rom type makes any difference to whether the net works?

D C Pitts
7 Station Road
South Cerney
Glos.

# Unofficial bug

Perhaps you will be interested in a genuine bug on the Amstrad — not produced by using unusual variable values, or the like — and which I think ought to be publicised because Amsoft have not officially acknowledged it.

I was trying to think of a name for those who take an interest in bugs, and after a moment's thought decided it was safest to say nothing— "buggies" being a bit lame.

The function Dec\$ does not work in Amstrad Basic although it is listed in their concise basic specification.

If you feel like trying it, type it in a program and you will see that the interpreter recognises the word and converts it to upper case, but execution will fail with a "Syntax error" report. Extremely unhelpful and time wasting, if you have spent two hours trying to work out what you had done wrong.

It seems this is the reason that the function is not listed in the User Instructions Manual

You can simulate the function to a certain extent with: Right\$(Str\$(<numeric expression>),<sub-string length>). But this will not give you the handy formatting leatures of Dec\$, eg, automatically getting a "" in leading empty digit positions.

Finally, in the hope of keeping the software lads on their toes, it would be nice to have software delivered by promised dates. Amsoft's (Tasman written) Amsword wordprocessor was on III day delivery in July. Amsoft have been as helpful as they can be, and said Tasman were going to have it ready to go out by the end of September.

An unoptimistic call to them last week received the reply that it was still not out of Tasman's hands. Perhaps the Spectrum Plus issue will inspire them...

John Mawhood 4 Landford Road London SW15

Random

I would be interested to hear if anyone has found the same 'bug' which has crashed my game of Psion Scrabble for the Spectrum. When using the Quit procedure and requesting to continue the game with the same players all I got was 'B integer out of range, 10. 11'.

I would also be interested to know from which dictionary the vocabulary the game knows was taken. Some of the words appearing are certainly not in any dictionary I can find!

Does the computer challenge at random? The word Qua—a valid word—is used by the computer quite often. But, on the four occasions I have used it the computer has challenged it twice.

L T Rees
10 Granville Court
De Beauvoir Estate
Baimes Road
London N1

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AGF products for the ZX Spectrum are compatible with the new Spectrum Plus computer.

# A drop in the ocean

Graham Taylor visits the Micro Training Programme which aims to prepare teenagers for jobs in computing

This Christmas thousands of parents will be bludgeoned, harassed, goaded and emotionally blackmailed into paying anything between £100 and £400 on a micro computer. The gist of most devious arguments from astute teenagers will be the claim that somehow a micro computer is going to help at school, with homework and, most tellingty of all, towards getting a job.

Getting a job is difficult. Despite everything ever untered by everyone about an inevitable momentum towards a technological age, there are still few opportunities for school leavers in computing. Employers,—those prepared to train school leavers can pick and choose from a large number of worthy candidates.

Giving teenagers an edge in the fight for jobs and helping them discover where their computing strengths lie is the Micro Training Programme — a year long course for reasons; we wanted a networkable system, running Pascal, which could run the kind of software most used in businesses, such as Wordstar and dBase II."

The year's course is divided into various sections, designed to cover the most important areas of computing. There are five week blocks covering software, hardware, business applications, a residential course and an important work experience section using computers in a real company.

I wondered what sort of people had joined the course — were there more men than women? Did they have any existing technical skills — did they already own micros and if so was that an advantage? "Well, the ratio is 70/30 in favour of men and that reflects the original applications. I wish it were 80/80, but short of positive discrimination, which has a lot of problems associated with it, there's little we can do.

"In terms of skills, whilst some had O

levels or CSEs, there doesn't seem to be any special link between those kinds of skills and doing well here — girls tend to get used to the computer keyboard quicker since they've often had some sort of typewriter training already.

"I think a couple of our students have micros, but, whilst it's obviously not a bad thing, there is a general problem — people are Basic in a very unstructured way and

think they know quite a lot, but here they really have to start again. Apart from the fact that we teach Pascal as our main computer language, it's more a matter of approach.

So are home micros really relevant at all? "Well, for our purposes no, but then we aren't here to play games — I usually tell people here not to buy them. Apart from anything else, they don't have much money [Standard weekly pay under the Government's Youth Training Scheme under which this falls is £28.25] and they are free to use the equipment here."

The course is not confined to strict computing matters alone; towards its end there is the task of sorting out work placement which will utilise a student's talents and teaching basic skills like letter writing and interview techniques.

This is Dawn Charles' job. "I think a lot of kids come here with unrealistic expecta-

tions about what's possible — you have to help them see that they're not going to jump straight into well-paid jobs in computing.

"What I think we can do at the end of it is produce someone who would make a very well equipped trainee or be suitable for more advanced courses. But of course it's a two sided thing; so far as is possible we try to guide the students towards what they feel they want to do.

"The work experience section of the course starts in February and all in all I suppose we've been pretty lucky. People like Esso, IBM, the GLC, as well as local firms have all offered jobs at the end of it."

The centre has charity status and is funded by a mixture of donations and various government grants. There are plans to develop it further, by introducing evening courses for 16 and 17 year olds who would receive instruction in basic computing topics and gain hands-on experience with the machines.

There are three further developments planned for the centre; a word processing bureau, a computer consultancy and possibly, but less certainly, a micro-shop. Some of the profits from these operations would go towards the micro-training program, but the hope is that successful entrepreneurs will come in to run the operations, investing their own capital and taking a share of the profits. The entrepreneur would gain certain advantages like access to a lot of useful computer information and a rate-reduced site in Covent Garden. Solvent and proven wiz kids should apply direct.

Said Dawn, "Next year we're hoping to take a slightly higher number of students and get more equipment, but I should stress that we're full up for the time being and, anyway, have to give priority to local young people in the Covent Garden area. What we do need is support from manufacturers, we have some but we always need more."

Manufacturers and other people interested in supporting the Micro Training Programme should contact them at 99-103 Long Acre, Covent Garden, London WCZE 9NR, tel: 01 240 8377. There are no vacancies on the scheme for students at present.



16 and 17 year olds run by the Central London Youth Project. The intention is primarily that the training provided be practical, that students who complete the course should end it with a real chance, not only of getting a job, but of going on to colleges for further training.

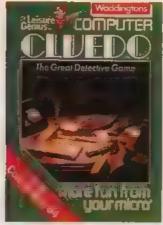
I visited the project which is based in Covent Garden and talked to the manager, Steve Jolly about its aims and intentions.

"Although we don't demand any specific qualifications, when we started in June we were clear about one thing — students had to show some sort of motivation towards new technology and we had to be convinced they would last the course."

The centre is equipped with IBMs and Apples rather than BBCs or Spectrums. Why the expensive gear? "When we started there was a deliberate policy decision that we would buy business machines rather than small micros. There are a number of

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The Spectrum (+) Connection

25-31 OCTOBER 1984 13

# Cattapilla

Wander around the garden eating as you go....but watch out for Sammy Snake in Cattapilla for the BBC or Electron by Colin James

he program is in two parts, the first part containing instructions, the second program containing the game Cattapilla. It is a version of the old favourite, where as 'Catty Caterpillar', you wander around the garden, eating food, getting longer as you eat, ensuring you don't cross your body and avoid hitting any of the walls.

This is relatively straightforward, until the third and subsequent screens, when you have to avoid Sammy Snake, who will also be wandering around the garden.

Also on view during the game is onscreen scoring, the high score and the name of the person with the high score. # score over 500 can be considered very good.

Type in the first program, and save it on tape with Save "Cattapilla". Then type in the main program, and save it on tape after "Cattapilla" with Save "Catty". Then load and run the first program with Chain "Cattapilla". The main program should automatically load and run after you have read the instructions.

	POLICE MANAGEMENT
Program I	
10-20	Program will automatically run if
	Break or Escape keys presend.
30	Sets initial colours
40	Switch off flashing cursor
50	Moves cursor to top right of screen
60-260	Instructions
900-330	Putz a value into variable (D%)
	depending on which micro is used
340-430	Displays the movement keys, &
	Chain's the main program
30-190	Main program loop
200-290	Procwall - draws the wall and
	garden, puts up score, high score
	and high scorer
300-430	Procecreenone - draws the addi-
	tional obstacle walls, which appear
	after the first screen
480-480	Procecreentwo - draws Samuy
	Snaire at the start of screen three
	and all subsequent screens
490-510	Procblocker - moves Sammy
(43	Sanke
520-620	Procmove - general movement
	routine
630-690	Procinitialise all - sets the initial
	variables and conditions at the start
	of every screen
700-780	Prochead draws Catty's head, if
	there is no obstacle in its path
760-810	Proctail - moves Carry's tail
620-900	Procfood - draws the food on the
	screen.
910-960	Prochit — if the caterpillar moves
	on to an obstacle, this routine
	decides which obstacle has been

Prochitwall - called when Catty

hits a wall, to end the garne.

1030-1000	Procestself — as Prochitwall, but called when Catty tries to cross his
	own path
1080-1200	Procescore — prints up score at end
	of a game, if it is a new high score,
	allows you to enter your name
1210-1230	Procpause - gives a pause of
	about three seconds
1240-1360	Procusar-graphics - sets up the
	user defined graphics, and line
	1330 switches off the cursor
1360-1370	Prochitsnake - as Prochitwall, but
1000	called when Carty tries to cross

Sammy's path

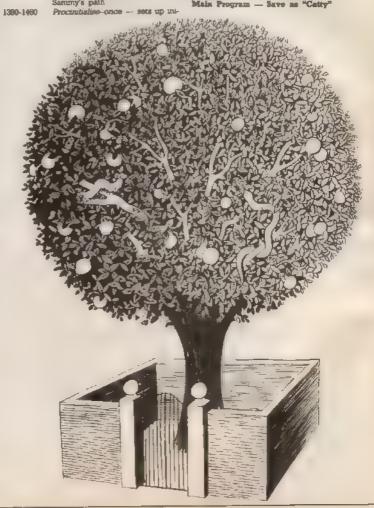
tial variables. 1470-1510 Procnewscreen - called at the end of each screen. 1530-1830 Function which returns the colour

of a specific point on the screen The data statements from lane 1840 onwards

should be copied carefully as they contain movements of Samuray Snake. Lines 10 and 30 from the first program, and lance 20 and 30 from the main program may be

omitted unitially so that the Escape and Breek keys both work as expected.

Program 1 --- Save as "Cattapilla" Main Program - Save as "Cetty"



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\* symbol shift \* space bar

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# Machine review

# Repackaged

Machine Spectrum+ Price £179.99 Supplier Sinclair Research, 25 Willis Road, Cambridge.

he major novelty of Sinclair's new computer is that it is available in high street shops now.

But then if that were not the case the whole exercise would have been pointless.

The market for home computers has become notoriously seasonal, with the majority of sales occuring in the weeks before Christmas. The task of the Spectrum+ seems to be to steal sales from the Commodore 64, Acorn Electron, Oric and, perhaps, the Amstrad.

I will be very surprised if it does not succeed. For £179.99 you get a computer that has a reasonable keyboard and whose slightly outdated specification is more than compensated by its huge software base. Six programs, including the excellent word processor package Tasword Two and Scrabble, are included in the price and, contrary in some press speculation, the Spectrum+ can use all the peripherals designed for the original model.

There are only a few differences between the Spectrum and the Phis, and only one that really matters. The technology used to produce the QL keyboard has been employed to give a "real keyboard" to the Spectrum; 67 keys and a space bar adorn the top ill a new, larger casing which measures 12-5 by 6 by 1-8 inches. I still find the Spectrum+ a small machine, but it certainly is more substantial than its prede-

To give credibility to my judgement of the keyboard I am writing this review on the machine itself, using Tasword Two. I have entered some fairly long programs on the OL's keyboard, and the Spectrum + has the same 'soft-but-noisy' action. You get used to it, but a few moments spent using something with a 'proper' switch mechanism soon puts



the membrane arrangement into perspec-

It is not just the tactile qualities of the new Spectrum keyboard that have been improved: the extra keys mean that less gymnastics are required to program and write. The old keying sequences will still work, although they are no longer marked. The cursor keys are placed either side of the space bar: there are also pairs of shift keys either side, with caps shift boasting doublesized keytops. The other additions are Extend, Edit, Break, True Video and Inverse video, Graphics, Caps lock, and the puncquation marks except colon, delete and

These last two are oddly positioned the break key is where most micros have their delete keys, top right, while Sinclair place the delete key almost where you would find escape or break on other machines, top left.

Interestingly, I tried the new keyboard and case, fitted onto my old Spectrum and there were no problems. Anyone who has attempted to attach a conventional key-

> board to their Spectrum may wonder how the doubleaction keys are wired up without any additional hardware. Normally, using diodes to connect two keys together to be operated. by a third will fall fool of the keyboard scanning routine: for reliable operation the shift key must make contact first. On the new keyboard this is achieved mechanically by the membrane under the keys.

Two more improvements are visible on the Spectrum+. A reset button lies under the left-hand edge, a welcome addition but perhaps a little dangerously placed.

Also, the whole computer can be tilted with the aid iii two retractable feet under the back of the machine. They position the machine at a comfortable angle, and snap in and out very positively - opening up the case revealed that the springs are actually made of plastic.

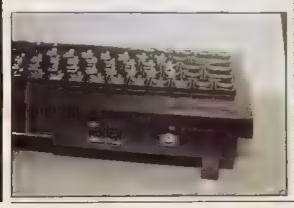
Not much else of interest is found inside as the circuit-board is standard Spectrum issue (4B actually).



Obviously, therefore, there will be no problems in running Spectrum software the one pendantic point that I can think of is that some older software may instruct you to use the cursor keys, but actually mean the unshifted keys 5 to 8.

There is a thick metal plate behind the keys, giving a bit more mass to the whole affair, and the extra space and slots mean that the speaker sounds louder, so much louder that it may be irritating to some.

The six programs supplied with the Spectrum+ are Tasword Two, Scrabble, Chess, Vu-3D, Make a Chip and Chequered Flag. This is almost the same selection as is currently being bundled with the old Spectrum as a 'six-pack' special offer. except that Tasword and Vu-3D, replacing Horace Goes Skiing and Survival, gives the



Continued on page 23

The ZX Spectrum

Expansion System. Only £99<sup>.95</sup>

Sinclair's complete alternative to floppy discs...



Tasword Two word processor Turns your ZX Spectrum into a high-quality word

processor Tasword Two has all the essential features of professional word processing packages - move and copy, insert, margin settings, help' pages, find and

replace, and much more. Written by Tasman Software Ltd. Usual price (RRP): £13:90.

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Masterfile is a menu-driven filing and retneval system of immense power. Display formats are user defined, so the range of applications is enormous. Written by Campbell Systems Ltd. Usual price (RRP): £16.95.



#### **Games Designer**

Now, all you need to create original games are original ideas - and Games Designer It has eight, very different, pre-programmed games for you to play as they are - or modify out of all recognition! There's never before been an easier, more enjoy-

able, way into games design. Written by Quidealva Ltd. Usual price (RRP): £1495





The all-time classic ITO strategy game, Ant Altack combines stunning Escher-like graphics with fastmoving action and a real tactical challenge.

Your task is to enter the walled city, seek out. your captured partner, and escape. At all times you can choose from four angles of view But beware: the city is passolled by giant ants.

Written by Quidesilva Ltd. Usual price (RRP): £6.95,



All programs run on a 48K Spectrum or Spectrum +. Recommended retail prices are for each program on cassette

# includes this Microdrive Expansion System **Ant Attack** great set of **Games Designer** Microdrive program

The unique ZX Microdrive system sets the Spectrum apart from till other home computers.

gives you all the advantages of floppy disc drives - at a fraction of the cost. And tests show the Microdrives are faster than some disc drives.

Now, the complete Microdrive system comes in one package together with four of the

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This software alone would normally cost you over £50. Yet the Sinclair price for the complete ZX Spectrum Expansion Pack is just £99.95!

You'll find full details of its contents

in the panel opposite.

TE E

#### ZX Microdrives-another Sindair first!

The ZX Microdrive is a revolutionary fast access/mass storage device. And it's the only truly affordable alternative to disc drives ...

 Loads or saves up to 85K of program or data from Microdrive cartridges.

Just 3.5 seconds to access a typical file. computers using RS 232 (the industry-

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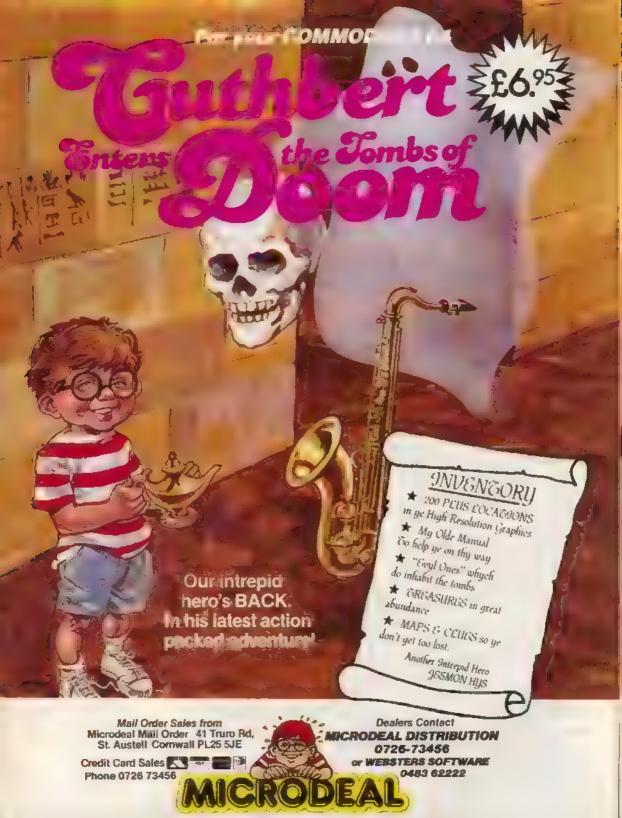
The ZX Spectrum Expansion System adds an exciting new dimension to Spectrum and Spectrum + computing. At £99.95 it's superb value too.

To find out more, call in at your local Sinclair stockist nowl

Sindair Research Ltd, Camberley (0276) 685311.

\* 28. ZX Spectrum, ZX Microdrive, ZX Net and 7X Interface are Trade Marks of Smelair Research Ltd.





Selected Microdeal Titles available from computer dealers nationwide or from targer branches of John Mercoes and Politic

# Machine review

Spectrum + programs a more serious slant.

Overall impressions are of a stylish and fairly solid computer, still not as substantial as the CBM 64, but in the same class. Unfortunately this image in spoilt if you turn the machine upside down and a number of the key-tops fall off. That could be a little annoying.

The manual that many Spectrum owners have come to know and love has — with the Spectrum+ — been replaced by an altogether more glamorous book. Using colour photographs and illustrations, it deals with the fundamentals in great detail. There are a number of simple routines to show off the graphics and sound and then a reference section for the Basic commands, while the few remaining pages gloss over machine-code and computing in general. This leaves the back cover on which to advertise some Basic programming books from the publis-

hers of the manual.
Information not included in the new
manual includes details of system variables,
memory formats and the op codes attached
to the character set table.

Overall the new manual reminded me of those glossy instructional books about DIY and car servicing: very good up to a point, but a little patronising.

The new welcome tape - a replacement for the Psion Honzons tape - falls into much the same category; very hot on the

graphics but somewhat shallow. Side A contains a keyboard trainer with very good screen displays. If you break into the program a remark warns you that it is not an example of structured programming, "it is just meant to work". I broke in to find the bug that, when I had scored 100% on the graphic keys section, told me I needed more practice! The B-side contains only one program, but that contains two enjoyable games and an excellent user-defined character generator, the results of which can be fed into one of the games, Maze Chase.

So — the Spectrum+ is more a good example of marketing and repackaging, than a wildly innovative product.

For my money, I would have liked to see either Interface I or 2 built in to the new computer, but then it would never have been ready for Christmas.

The current price difference between the Spectrum and the Spectrum+ of £50 only makes sense if you believe that the software currently being bundled with the Spectrum (the six-pack) is a special offer and that the six programs with the Plus is a permanent part of the package.

Nevertheless, the Spectrum + should botster Sinclair sales considerably this Christmas and, after eclipsing the old Spectrum model, will probably take its place.

Jeff Naylor



# Free ticket offer

# 250 free tickets

# for the 14th ZX Microfair

Popular Computing Weekly is giving away 250 free tickets for the 14th ZX Microfair — to be held at Alexandra Palace on 17-18 November — to the first 250 people who submit programs for the ZX Spectrum or QL for possible publication in the magazine before November 12.

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All you have to do for your free ticket, valid for either one of the two days of the show, is to enclose a stamped addressed envelope with your program submission.

Remember — the tickets go to the first 250 people send in a program and the offer applies only to programs received by us no later than midday on November 12.



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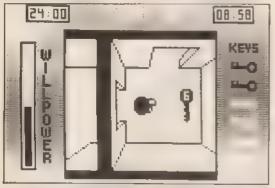
# Touching

Program Backtrack Micro
Dragon ■ Price £6.95 Supplier
Incentive Software, 34 London
Street, Reading, Berks.

This is a maze game for one, in which the player steers Eddie' through the labyrinth. In order to escape, he has to pick up four keys in sequence and then find the exit door before his dwindling will-power is used up.

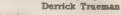
player nominates. The display is very good, being a bird's eye view down into the maze with 3-D perspective. Outside walls have windows which helps orientation except that some mazes have interior walled gardens. The sound of Eddie's running feet as his willpower drains away is quite touching.

This is a game of patience and endurance. The supplier's guide time for the first game is eight minutes and for the fifth is 40 minutes. They either regard the game as insoluble or have



To assist him there is a map of the maze if he can find it and some items of fruit to revitalise his willpower. To make life difficult, there are snakes in other rooms of the maze which may or may not be lethal and a genetically mutated rug with nasty habits.

Control is by the arrow keys or by any other keys which the great faith in their sales, for the package includes a competition with a prize of a Cumana disc drive for which the entry qualification in to know what Eddie does after completing Test 5. So far, that prize is nowhere near my grasp.





#### Gruesome

Program Red Sky over Accrington Price £6.96 Micro BBC B Supplier Vampyre Software, P.O Box MT15, Leeds, LS17 8DW.

ed Sky at night means it went off all right! The game Red Sky Over Accrington begins on lat July 1985, and over four days the newspaper reports gradually worsen until nuclear war starts.

Red Sky is a kingdom style game where you have to outguess the computer on the correct proportions of supplies, food, drugs, and access to shelter to get hold of. The scenario is gruesome but the horrible fascination lies in trying to imagine how values would change in such a situation. What price gold? What price an anti-radiation drug?

You have a choice of actions such as 'move', visit casino' and 'buy shelter' but there is only a limited number of these activities before your time runs out. There are simple graphics and a choice of city, mountain, river-bed or grassland land-scape, with varying hazards on them including fire, flood, earthquake, infection and mutants.

If you can overcome your horror at the situation, it is a competent strategy game, but its sale is probably limited to those who will enjoy its sensationalism.

Ian Watterson



## **Outsider**

Program Racing League Micro Spectrum Price £2.90 Supplier Racing League Software, 22 Lindale Garth, Kirkhamgate, Wakefield, W Yorks.

a race horse? Or three of them? Racing League lets you join H Copper, M Thatcher, HM Queen and others in the Sport of Kings.

There have been several racing games for the Spectrum, none of which in a Derby winner, but even in such an uninspired field this maiden should be despatched directly to the knacker's yard!

They're off — Racing League with a '0 OK, 0:1' message. Only a donkey won't Run

without prodding! To be fair, the screens that follow have reasonably clear instructions and error trapping.

But if endless Entering, tables and weighted randomisations were all that the turf had to offer. Brough Scott would be out of a job. Player choices are minimal and, if you should win, the first you will know of it is the result—there are no graphics.

The letter accompanying the review copy speaks of this as the basis for exciting enhancements to come. They should be part of the program now.

Cheap as it is, Racing League is worse value than backing a rank outsider. At least that could give you a momen's excitement for your money.



John Minson

# Evil force

Program Heroes of Karn Micre Commodore 64 Price 27.00 (cassette) £9.00 (disc) Supplier Interceptor, Lindon House, The Green, Tadley, Hants.

bed as a graphical adventure with music.

In fact, it m a pretty standard text-based adventure game with hi-res pictures accompanying each scene, with occasional snatches of music at some of the locations. The setting of the adventure is in some indeterminate historical fantasy world in which the Empire of Karn has been overrun by the Powers of the Night, including dragons, vampires, and other obligatory nasties. Only four ## the Heroes of Karn have survived, and they have all been taken captive by the evil forces. Your quest is to free them, and recover the treasures of the Empire.

The game is structured in the usual adventure style, with reasonable number of locations and hazards. The procram seems to understand quite a large vocabulary of commands and objects, and even allows you to give instructions to other characters, who will carry them out if they are willing. The graphics provide illustrations of the locations, but they do not enter into the game directly. Although they are quite well done, they are painfully, achingly slow to draw. Fortunately, they only appear on your first visit to each location

It is a quite challenging adventure, with enough locations and other characters to keep you occupied for some time. It is perhaps best to think of it as a text adventure and regard the graphics as a nice extra feature. But they're so slow.

Richard Corfield





# Reviews



Marlin's out. I'm Grymalkin, he sent me to help you.

Do east to got out of the tower but we ought to find a compass first.

#### Adventure

Program King Arthur's Quest Micro Spectrum Price £7.95 Supplier Hill MacGibbons, 92 Fleet St., London EC4.

ere is a very playable, complex and addictive adventure, both challenging the mind and requiring quick reactions at times. There are eight areas to explore during the game, and each has its own perils and opportunities.

The graphics are generally good, and the comments helpful. With the cassette comes an instruction booklet and a wall poster containing relevant history and a code chart. All play is by single key press, except for spells which you type in full. Without giving too much away, I can say that it is worth your while to explore each area fully before moving on, and to write down everylang you are told, no matter how useless or odd.

The game is identical each time you play, so making a map is a very worthwhile activity. It was crash free during testing: though the move commands sometimes seemed a little odd or perhaps my mapmaking was at fault! There is a "Save" option, enabling you to start from half way through if you are killed off during a game, and I should mention also the facility back up the game to Micro-

really enjoyed King Arthur's Quest, and Mi recommend it as good value for money for games users who want a new challenge, and more serious users who like a bit of light entertainment from time to time. This program works the mind as well as the fingers, and should be a success in the run-up to Christmas.

CCCCC

# Scrabble

Program Scrabble Price £12.95 Micro BBC B Supplier Leisure Genius Retail

can't help wondering how many PhD thesies have been turned into successful computer games. This is one. Peter Turcan created it while researching word structures. The game caused a sensation when released on Sinclair machines a year or so back. Now, despite memory restrictions, it is here on the BBC B.

The game itself is standard Scrabble - a board game using letters set out in turn by each player and forming intersecting words rather in the manner of crossword puzzles. Various scores apply to each letter and to special positions on the board.

Simon Springett

The micro version replaces board and loose tiles with a screen display. The colour of hoard and tiles can be modifled to find the selection which best suits your screen. Up to four players can take part and any of them may be the micro



The cleverest part is the word checking. The nucro can check 8,000 words from its own store. If it fails to recounse a word it asks you to verify it. The game plays well and quickly with all the facilities you can emoy with a board version.

It is guite fun but one has to

ask why - unless you are a compulsive Scrabble player isolated on a remote island you would want to play with your Beeb rather than a fellow human?

Dave Watterson

## Jet-BBC

Program let Pac Price £6.95 Micro BBC B Supplier Ultimate, Ashby Computers & Graphics, The Green, Ashby-dela-Zouch, Leicestershire

an you construct a rocket while defending vouself from flying aliens with continuous laser fire? That's the challenge in Ultimate's Jet Pac.

You move around with a booster rocket strapped on your back and collect the rocket parts from different platforms suspended in the air. Once the rocket is complete, you have to fill it up with six packs of fuel and then you can fly to the next planet. The fuel has be dropped over the top of the rocket, which turns blue as it fills up. Each planet is harder than the previous one. The sound effects are strident and lively, the movement swift and smooth.

It is confusing | first, but once you get the hang of it you move faster and are able to progress.

Dave Watterson





# Space Maths

Program Space Professor Micro Spectrum Price £5.99 Supplier Front Runner, K-Soft Distribution, 620 Western Avenue. London W3.

pace Invaders get education! Mathematical monstrosites (ie, wrong answers) fall from space towards a sum, with only a laser base and your mental arithmetic to zap them.

Computers are often accused of distracting children from their studies, so a program combining education and alien-blasting should please parents and off-spring alike. But will maths become fun when the reward is saving the world rather than a gold star?

In its favour Space Professor offers a wide range of difficulty (252/84? Quick!). Its menu, using icons, is extremely clear.

But chrome is mere flash when the game below is dull. Work out the solution, shoot the wrong answers and let the right one land

There is also not enough time to read the problems before the aliens appear, making Space Professor too difficult for the youngsters who may benefit from it.

Sadly the ultimate incentive is not to practise maths but to Load a game with more variety.

John Minson



## Hilarious

Program Lingo Price 59.98 Micro BBC B Supplier Complete Microcomputer Services Ltd., 32-38 Osnaburgh Street, London NW1 3ND.

his program, based on an idea by Alan Wakeman, is intended to teach sentence construction. It is built into a fun game which can be played on your own or with up to four players.

'with'

The game is easy to use, well explained and with simple controls. Your score takes into account how many if the 12 words you use (with a bonus if you involve them ail) and how many of the pool words you use. The micro has to take your word for it that the sentence is correctly constructed so its value as an unsupervised educational aid in very limited. You may set a time-limit if you choose.

The final story when read out



The program has 700 words and it chooses 12 at random which you then have in construct into a sentence with the help of a pool of common words and terminations: the cement that binds words into sentences like 'the'. 'ly' and

may be grammatically correct but its absurdity is usually hilarious. That's what makes Lingo fun m play.

Jan Watterson

# 2222

Program Supabasic Micro Commodore 64 Price £9.99 (cassette or disc) Supplier In-

terceptor, Lindon House, The

Słow

Green, Tadley, Hants.

Commodote's decision to equip the 64 with a rather primitive version of Basic has led as the appearance of a large number of

Basic extension programs.

One of the latest is Supabasic from Interceptor. This gives you a further III Basic keywords covering the usual range of additional commands for graphics, sound, sprites and programming aids.

Unfortunately, no structured Basic keywords are included.

Although the new commands do include a number of handy additions there are a number of notable omissions. For example, there are various commands for manipulating a hi-res display including

some nice features like a Window command to display a tent window at the bottom of the hi-res screen. However, only standard hi-res mode can be used, not multi-colour, and a number of other popular commands like Circle and Fill are missing.

Similarly, programming aids like Old and Renumber are provided, but no Auto and Delete which are at least as useful. On the other hand, the facilities provided for the handling of sprites and user-defined characters are quite complete and easy to use.

The biggest drawback of Supabasic is its execution speed, or rather lack of it. Although many commands execute at roughly normal speed, both numeric and string expressions are evaluated at a snail's pace — two to three times more slowly than the standard Basic.

John Minson



## Time Lord

Program The Key to Time Micro Spectrum Price 55.95 Supplier Lumpsoft, 17 Hardrow Road. Leeds

his is an adventure game based on the travels of a certain Time Lord, well known for travelling about in a police box. It is a tent only adventure, but none the worse for that.

The Doctor has been placed under your command, and your task lit to help him to find the five parts of the Key, thus, as usual, saving the universe. The game recognises a wide vocabulary fairly well — with the exception of the phrase "go to" which usually got the reply "I can't tie a rope to that!" There are numerous more or less



useful objects to find, retrieve and use,

This game is a good one. It promises all sorts of adventures for the budding Time Traveller, and many hours of enjoyment. There is no "Save" option — the length of the game makes this a sad omission — and no microdinue option either. These are minor problems in a well designed game, and is should do well.

Simon Springett

# 2222

## Bearface

Program Castle of Gems Price 23.70 Micro BBC B Supplier MRM Software, 17 Cross Coates Road, Grimsby.

Bertie Bear has to eat all the gems on each screen before his rivals do. The opposing characters include spring-like Gem Cohblers, Gremlins, deadly Moving Trees, Ghosts and Witches. If he puts on the hat he becomes inside and invinvible he can kill witches and walk through his competitors.

The castle setting is like something from Escher — endless staircases with occasional lifts so that moving around can be confusing at first. When all gems have gone from one screen Bertie can progress on to the next.

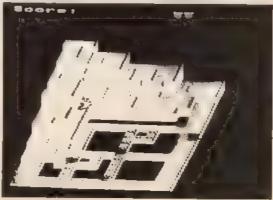
There are nine on each side of the tape — each harder than the last some are faster, some have more enemies, some have more complicated stairs and paths for Bertie to follow. Honeypots appear on some screens and give bonus points.

The controls are left, right, up and down, which you can operate from keyboard or joysticks

It is great fun to play being fast, furious and colourful. It has good sound effects and music, is easy in pick up and compulsive to play. If you can't get to an arcade in play Crystal Castles, it's a good second.

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# Bigger and bigger

Make your screen just a bit bigger using this m/c program by Stuart Nicholls, for the 48K Spectrum

Spectrum owners, would you like to be able to enter the following types of line into your BASIC program:

10 REM SET UP SCREEN (24 lines)

28 border 4:PAPER 2: INE 7:PRINT CHR\$ 12; 38 PRINT AT 23,6 "THIS LINE STARTS ON THE ACTUAL BOTTOM LINE OF THE SCREEN... WOT NO ERROR REPORTY

MEM SCROLL THE SCREEN .. TWICE

50 PRINT CHRS 11; CHRS 11;

What's this? Printing on the Edit lines without the usual Print #8; at 9,6; "message", clearing all 24 lines and a scroll call Print Chr\$11; with no sign of a machine code routine Usr call. Well, the answer is yes it is possible and what is more it is not interrupt driven, does not require the microdrive 'shadow Rom' and works on a standard 48K Spectrum. (I assume it will work with microdrives attached but heve not been able to prove this).

Although the answer is of course a machine code routine, we do not need to call it in anyway, as the Spectrum can be made to do this for us using a simple Basic command.

The Spectrum Rom machine code routine to Print a character makes use of an all-purpose subroutine accessed in machine code using the well known Rst 18d instruction. This subroutine normally occupies Rom area 4974h to 4EA3h and handles printout feithe Upper screen, Lower screen and the Printer so is slow in comparison to a dedicated Upper screen Print routine.

The word normally in the above statement gives a clue to the answer. The Rom Print subroutine is accessed by the Rom using data in Raml That is, whenever printing to the Upper screen is required Stream 3 is selected and the address of the Print Output routine to be used is taken from the Channel S data in Ram. The base

address of the channal data is pointed to by the system variable *Chans 23631/2* and is normally situated after the system variables occupying the 21 bytes before the Basic program area (the fitting of a microdrive will alter this).

The Channel '5' information normally occupies addresses 23739-23743 and is in the form:

23739/40 Address of Output routine 48F4 23741/42 Address of Input routine 18C4 23743 53h Chr Code "5"

So you can see that we are able to alter the output routine address to point to a user written routine, and that is exactly what has been done.

I have produced a revised Print routine with games programers in mind, although it has its uses for more serious applications, and gives other functions.

Because Keywords and the Spectrum graphics characters are seldom used in actual programs, and I wanted the new routine as short as possible to speed things up, these are ignored. For a similar reason Inverse has been left out. Characters 32 to 187 and Udg's are printed, as are colour, AT, TAB, and NL controls (You are still able to use your own character generator in Ram if you wish in the normal way).

Printing is allowed on all 24 tines. For example Print link 6; Paper 5; Over 1; At 23,6; "A" is quite acceptable and will print on the bottom line.

If the line or column number exceeds the screen size then the routine will amend it to stay on the screen, providing it does not exceed 265. For example, Print At 24,32; "A" is the same as Print At 8.6; "A". This can give the effect of a wrap around screen.

If printing runs off the bottom of the screen then the screen will automatically scroll and does not give the usual 'scroll?'

Because the Basic Cls will only clear 22 lines (0-21) I have included a Clear 24 lines code (also Cls will re-instate the Spectrum Rom routine). Print Chr\$ 12, will clear the screen using the permanent colours and set the print position to 0.0; A semicolon must be used to supress the newline code that would be printed if we used Print Chr\$ 12.

Print Chu\$ 11; will produce an Upscroll but leave the print position unchanged. Note again that the semicolon has been used. Print Chu\$ 11 will produce an Upscroll with a Newline.

Print Tab column; is also permitted, and has the advantage over the Spectrum routine of not removing printing between the current print position and the Tab position.

The interrupts are disabled whilst printing and scrolling.

Using your favourite Hextoader enter the code from the Hexdump. The checksum byte at the end of each line is the sum of the previous 8 bytes. The start address is 64506 and the routine is 465 bytes long.

Once entered then Save the code using Save "nume" Code 64589,465. To switch routines you should enter a line into your Basic program before any Print commands as follows.

Without microdrive fitted use 18 8,251. With microdrives fitted (but note that the routine has not been proved this way) use;

Let Chans - Peek 23631 + 286 > Peek 23633
 Poke Chans + 5.244: Poke Chans + 6,251

This Pokes a new value into the output routine for channel 'S. This new routine will now remain in operation until a Cls command is used or the Spectrum produces an automatic listing. This in no way affects the use of the printer and error reports or Input commands will overprint on the Edit lines using Bordercolours.

Using all this information, you will see that it becomes very easy to move characters over all the screen and so improve your games programs. I have included my Assembly listing (using the Picturesque assembler) should you wish to try out your ideas.

```
**************
A HEM PRINT ROUTINE O
     Stuart Nicholis
***************
                                                                                                                                               CODE in the A res."
*SCREEN FORMAT*
*TOP LM-Line 24/Col.33*
*BOT RMCLine 1/Col. 2*
*B register holds Line*
*C register holds Col.*
*NL holds SCREEN ADER.*
                                                                             FRE4 CDBPEC
                                                                                                                                  CALL
                                                                                                                                            FPOSN
                                                                             FBF7 FEZ#
FBF7 FEZ#
FBFC FE#A
FBFE BB
FBFF FE18
FBFF FE18
FC#1 B#
FC#2 Z189FC
FC#3 BF
                                                                                                                                  CP
JP
CP
RET
                                                                                                                                             DZ
NC,PNTIT
                                                                                                                                  RET
LD
LD
                                                                                                                                            NC
HL,CA-6
E,A
B,D
HL,DE
E, (HL)
                                                                             FC86 1688
FC88 19
                                                                                                           0176
```

# Spectrum

FC#A 19 FC#B EB FC#C CJB7FC	6238 P		POSH	FCCC ED4R7950 FCD# 10#5	1178		JR	EC, (UBG) BC, (UBG)
FCSF 42 FC18 41	#268 C7 D	EFB 6	5	FCD2 C3 FCD2 ED40345C	1190 C		PUSH LD	DC, (CHARS)
FC11 40 FC12 3P FC13 3E	#28# C9 D	DEFE A	13 12	FCD2 E8 FCD8 Zde8	1285 ( 1210 ( 1220 (	CHARZ	LD	DE, ML.
FC14 38 FC19 #C	9218 C15 2	DEFB 5	12	FCDA 6F FCDB 27	1200		ADD	L,A HL,HL
FC16 ZD FC17 3A FC18 39	9338 C14 P	DEFB 3	15 18 17	FCDD 29	7350 1310 7300		ADD	HL, HL
FC10 46 FC10 45 FC10 45	8358 C1A 0	DEFB 6	7@ 69	FCDF C1	1330		POP	HL, BC BC DE, HL A, C
FC18 44 FC1C 43 FC1D 42	0376 C18 0		67	ECEZ 30	1350 / 1360 1378		DEC	A
FCIE 41 FCIF 30	8498 C21 1	DEFE S	49	FCE3 3E21 FCE5 2682 FCE7 03 FCE8 4F	1388			A.33 N2,ALC: 11
FC28 3A	6415 C23 E 6416 I 6420 CLS E	DEFS S		FCEP BP FCEA D3	1419	MLLI	PERSH	C,A C DE
FC22 210848 FC23 118148	8421 t	I H	Ha.; 14384 DE.; 14365 BE.; 6143 UML?; #	FCEE D: FCEF C3	1438 1448 1458		CALL POP PUBH	Z, GCRLL DE BC
FC28 #1FF17 FC28 3600 FC28 EDBS	8424 8425	LDIR		FCFF C3 FCF# E3	1465			
FC2F 23	8476 8427	ENG P	NL DE DC,247	FCF1 SAPISC FCF4 BAFF	1466 1478 1488		LD	"Coneider GVER* "but NOT INVERSE" A, IPPLAG: B, 253
FC31 01FFB2 FC34 3ABDSC	6429 6436	LD I	BC, 2A7 A, 1ATTRP1 IHL1;A	FEF4 BA FEF4 BA	1498		JR.	C.ALLZ
FC37 27 FC38 ED38 FC3A 812118 FC3D 218848	#431 #432	1 15 1 18	00, 1021H HL, 16384	FCFA DEDB	1518	ALL2	LD	C <sub>1</sub> D
FC48 C354FD	#434 #435 I	JP I	BÉ TCL	FCFD EB	1548 1558 1548	ALL3	EX LB AND	DE, HL A, CDE I
FC43 #E21 FC43 CD76FD	#437 NEULN	CALL 1	80KFF	FOFF AB FDBS AE FDB1 12	1540 1570 1580		KOR	(NL) IDES, A
FC48 #5 FC4F C354FD	946# 9479	16 :	BETCL SETCL	FD#2 14 FD#3 23	1398		INC INC DEC	ML C
FC4E F3 FC4B CD7DFB FC5# F\$	8475 UPSCR		SCR	FD84 6D FD85 28F7 FD87 EB	1628		5X 16	NZ, ALL3 DE, ML
PCS1 CF	6477 6478 NDPNT 6488 I	RET		FD00 25	1639		DEC	H MITP
FCB2 114CFC FCBB 32MFBC	8498 TUZ	LD :	DE,CONT IFUDIA-1+,A	FDMC 61 FDMC 61	165F 165F		POP	DC C
FC50 1989 FC5A 1152FC	EDIS I EDIS I TAWAT	39	CHNOE	FDLB CP	1698	F	RET	HL
hC20 1882	#53# #53#	JR	DE, FV2 TV1	FD11 2C FD12 BF	1788	ATTR	RRCA	A <sub>4</sub> H
FC62 324850	6545 : 6545 : 6556 1VL		DE, CONT STUDIAL, A	FDL3 BF	1728		RRCA RRCA AND	3
FC40 245150	GDDD 1	LD I	ML, (CURCH)	FOLS EARS FD17 FASB FD17 47	1750		OR LD	BE, IATTRIT
FE69 23 FE69 23 FC68 72	#17# #19#	ENC	194, 2 , (F 194, 1 , (P 194, 1 , (P	FDIE ZE FDIE AB	1778 1786 1798		LD LD XOR	E INC.
PCAR CY	#6## #6##	PIET		FD20 A2 FD21 A3	1810		AND	D
FCAF CDASEC FCAF CDASEC FCAF ZAMESC	8628 8638	LD	DE, PRINT CHNOE HL. (TYDTA)	FD22 FDCH5776 FD26 7000 FD28 6607	1839 1839		DIT JR AND	E A <sub>4</sub> [2Y+87) Z,ATYR1 1**
FG75 57 FC76 7D FC77 FE14	884#	LD	D, A A, L 22	FD2A C#37 FD2C 2002	1850		#11 9#	M2,ATTR3
	#665   #666		"BHIT was 100M routine"	FD28 EE36 FD38 FDC95746	1098	ATTRL	MOX T18	34
PC79 BA1122 PC7C 2818	#42# #48# #485 1		"For colour codes" C, TEMPS NZ, TAB	FD3n E650 FD3n CB6F	1998		TIB	ATTRZ
FC7E 2A FC7F EalF	部合学部 各下 物ク無命	RACE II	A, D 31 C. A	FD3A 2002 FD3C EE07 FD3E 27	1438	ATTR2	XOW	HŽ,ATTRZ
FCB1 4F FCB2 3EIF	071# 072# 073#	6UB	C, A A, 31 C	FB3F C9	1958		RET	
FC85 CAMP	8746 8756	ADD LD	č, A	FD48 D5 FD41 D9 FD42 3AY13C	1978 1978 1971	PHPC	EXX LB	
FCBP DATE FCBP DATE	6708 6229 ATS 6788	LO	A <sub>4</sub> H	FD45 F5 FD46 3F2F	1973		PUBH LB LB	A; (PFLAG)   AF   A; 32   LTY(07), 1
FCSD 2002 FCSF C410	4900	ADD	90.ATL 2.ATZ 24 18.A	FD40 FD3A57WL FD4C D7 FD4D FL	1974 1986 1981		POP	AF
FC91 47 FC92 3610 FC94 98	6836 6836	LD SUB	A. 24	FD4E 32919C	T 各品等 T 各等多		EXX	TPFLAGI, A
FC93 47 FC96 C394PD	964# #83#	JP.	BETCL	FDB3 CP	2016	1	POP	"Find SCREEN POS."
FC99 7C PC9A CDB7PC	#BAB TAD #82#	CALL	FPOSH	F954 78 F953 CS	2016 2029 2023	SETCL	L D PUSH	A <sub>4</sub> B
FC95 81 FC9F 841F	2002 2003 2004	DEC	6 A 31	FD54 47 FD57 CD45FB	2838 2848		CALL	B, A Agpr
FCAL CO FCAL ST	992B	RET	P, A	FDSH 3E21	2050 2060 2070		PDF LD SUF	BC A, 33 C E, A
FCA3 CD4FFD	SPAN BPACE	CALL	PSPC	FROM PI FROM SF FROM LAND	289P		LD LD	D. #
FCAP LT FCAP EFA	#978 #98#	JR RET	MZ, SPACE	ED93 C3WEEC	2188 2118 2115	L	JP JP	STORE
FCAA F3 FCAB CBBFFC	#982   #985 PNTIT #99#	DI	PTALL	FD65 3E18 FD67 78	2138	ADDR	EUF EUF	A,74
FEAR ED43000	#### [	LB	(SPORN) , DC (DFCC) , ML	FDAY OF FDAA DF	2110		RRCA RRCA	D, A
FCB2 220450 FCB6 FB FCB4 CF	1815	EI RET		FRAD OF FRAC ESEA	2170		RREA	Z24
	1625 1 SC 1636 PPOIN 1848		BC, (SPOSN) NL, (SPOC)	FD6F 78 FD7# 2619	2198 2298 2218		LD	L,A A,D 24
FCBE C9	1030	RET		FD72 F648 FD74 47	2228 2236 2248		COPP LD PRET	64 H,A
FCBF FEBB FCC1 300F	LUSTE PTALL	CP JR CF	128 C, CHAR 144	FD76 1154FD	2245 2256	ECPS.L.	1.0	DE, SETCL
FCC3 FEP# FCC3 D# FCC4 DAAS	LATE CKUDG	SUB	165	FD79 D3 FD7A 78 FD7B A7	2255 2268 2275		LD AND	A.D
FCC9 C613	1138	RET	MC 21	FD7C CØ	\$50m		RET	A NZ

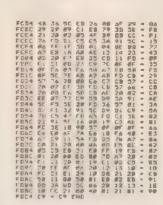
# Spectrum

		2285	1		
FD7D	212040			LD	ML , 48 28%
FDGG	8489	2300		LB	8.8
FDez		2310	SERI		
FD0.3		2320	20111	LD	C.T
FD95		2339		PHISH	
	EB	2346			
	21EUFF		BLAZ		DE, HL
FBBA				LD	HL . OFFERH
		495.2		ADD	HL, DE
	EB	5326		EX	DE, ML
FD&C			8282		ac,32
4 Dat		5348		LDI#	
F891		2488		LD	A,L
	A?	7410		AND	A
	20F1	2428		JR	MZ,SCR2
	212887	2438		LD	HL , 6726H
FRYA		2448		ADD	HL. DE
FD94	G.I	7450		POP	IEC.
FD9A	975	2460		DEE	C
FD9B	CS	2478		PUSH	ac Da
FD9C	30EE	2498		7.87	NZ,9CR3
EDec	9.0	2498		WOM.	0

FDOF	8628	21	566		LD	3.32
	12			CLNI	LD	CDE1.A
FDA2		2			1 NC	
						DE
+ 1944.7	LIFE	~	530		DINS	CLN3
FEAS	Ē1	21	548		PDP	BC
FUAG	E t	21	KIND:		POP	HL
FDAT			566		TWE	H
	1800				DINZ	
	2:2858					ECH!
				SCRAT		HL,5828H
	110030		598		LD	DE, 5888H
t DBS			688		LD	BC,736
EDB2	ETBO				LSIR	
F085	TAADSC	71	520		2 D	A, LATTRE
EDB9		24	530		LD	B, 32
AEG 3	13			CLNS		IBEL.A
FPRB	1.75		659		INC	DE
	· mar o		900		DJNZ	
D 1011.					BJMZ	CLN2
et an ener			505			
FORE	218648	21	57B	RESET	TB	HL, 4000H
FBCI	615161				LB	BC. BISIH
FBC4	69	51	170		RET	
		21	128		END	

HEXDUMP for 48H ZH Spectrum

F354	CD	87	FC	PE	29	02	AA.	PC		16
FBFC	FE	即台	De	E.E.	18	DØ	21	89		EC
FC84	FC	SE	16	6.6	19	35	1.2	63	-	E6
FCBC	CZ	8.2	FC	42	41	4.3	36	34		36
FC14	38	BC.	ZD	34	24	46	43	44		103
FCIC	43	42	45	319	3,0	F 5	21	1949		4F
FC24	40	1.1	011	48	61	FF	17	36	-	DF
FCZC	0.0	ED	34	52	13	81	EF	02	-	D5
PC34	AE	但以	30	2.7	ED	11.0	#1	51	-	37
FC3C	10	21	6.6	40	C 3	54	FD	匪	p-	VB.
FENA	21	€ D	76	FB	4.5	CI	54	FB	-	7A
FCAC	F3	CID	20	F D	FB	26	1 1	aC	ab.	7 B
FESH	FC	32	DE	50	1.0	40	3 1	52	+	TIL
FCSC	FC	18	83	1.1	a-C	E-E	32	SHE		DR
FC44	20	24	51	50	13	23	77	CP	-	24
FCAC	LL	Fie	FR	CB	65	FE	28	WE		00
FC74	SC	27	70	€E.	Lá	DA	11	27	-	51
FCPC	26	LB	.7A	Eø	1 F	4F	38	15		66
FCG4	O. !	Ca	83	45	76	0.5	2.10	3.0	-	42
F ESSE	FG	211	10 2	6.6	1.8	47	SE	18	-	A1
EC 94	70	47	63	54	FD	7.0	CD	18.79	-	EB
FCVC	8C	91	30	EA	LE	CB	52	CD	-7	AB
ECAN	40	FE	15	2 m	FA	C9	\$ 3	CD	-	F5
FCAC.	DE	+ €	(: D	4.5	13.0	50	22	84	-	75
化位用中	5.0	FB	6.0	€0	48	0.D	30	2A	~	0.0
ECDE	B-4	30	CR	FE	616	10	#F	FIE	-	ec.
FEC4	45	ne	Do	25	DE	Cá	55	CB		22
LCCC	4.5	相由	29	明作	IR	05	65	ED	-	DF





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# The plot thickens

Explore your artistic talents with Scribble written for the Amstrad by Brian and David Lewis

his program allows you to draw on the screen, either with a joystick, or by using the cursor controls. It shows you, amongst other things, the difference between mode Ø (20 column screen), mode 1 (46 columns) and mode 2 (86 columns) Program Notes plus the maximum number of colours for each mode.

Modes can be toggled from the Enter key, with the mode number printed #5 the screen. The are button (or copy key) prints out each colour (in that colour), whilst the screen can be cleared with the space bar.

Each mode change or screen refresh starts the cursor at 0,0 (ie, at the bottom Line 379 left-hand side of the screen).

The flashing cursor lets you know where you are on the screen, which is particularly helpful when drawing in background co-

Line 319-360

Lina 100 - initialisation Line 116-146 - adjusts x and y co-ordinates Line 150 - flashes cursor Line 160-196 - changes pen colour

Line 260 - plots x and y - if space bar or enter, Gosub Line 210-220

- adjusts mode, and associated

parameters - restores x and v to 6.8 lane 380 - clears keyboard buffer

Line 488 - sets up variables Line 416-478 - prints title page and instructions Line 489-499

 configures for cursor or joystick control

**Variables** CUISOF **SURE COLOUR** 

s

= value for on-screen cursor (either 0 or 1) = Maximum no. of pens in that

= value of key pressed = ASCII value of s\$ m screen mode = x co-ordinate for scaling

screen to fit mode colour - pen chosen = used with linkey to detect

key release = keycode for fire button сору = keycode for capy key FD808 - ASCII value of space bar apter = ASCII value of enter key

Lines 118 to 238 comprise the main loop of the program, 299 to 396 clear screen and change mode. Lines 399 to 500 are the initialisation submontine.

```
REM Hmstrad scribble
                                         18:7:84
                                                           B. & D. Lewis
100 G0SUB 400:5050B 310-G010 180
110 IF INKEYFOR J=Pressed THEN 9=9+2 5010 IS0
      INKEY.down/=Pressed THEN y=9-2
130 IF INKEYCleft Pressed THEN *=x=nump GOTO 150
140 In INKEYS might sepregsed little segring
150 cursor=1-cursor PLUE x/9/cursor
160 IF INNEY changecolour Forf THEN 200
170 colour=colour=1:IF colour=maxcolour IMEN colour=0
180 FEN coloun:LuumTe 30,1 FRINT"Colour="∵cucouk
190 IF INVEYCONAMSCOLOUR #Pressed THEM 190
200 PLUT X,9, colour
210 ss=INKEYs-IF ss="" THEN IIO
220 s=HSU(s# ) IF (sesPace UR seenter) [HEN 50508 300 GOTO 180
230 GOTO [18
2411
       END
299
       REM
           SCREEN CLERK W MODE CHANGE SUBROUTINE
300 IF s$=" " THEN CLS:GUTU 350
310 m=m+1-IF m=3 [HEN m=t]
320 MUDE M
330 IF m=0 THEN maxcolour=15 sumP=4
340 IF mm1 THEN maxicologras again-2
350 IF m=2 THEN maxcolour=1 *umP=1
36M PEN I PRINT "Mode" in
370 x=0.y=0.colour=1
380 MHILE S$C>"":S$=INKEY$ MEND
390
      RE TURN
399
       REM
            INTERCISATION SUBROUTINE
488 colour=1:off=-1:Pressed=8:+ire=76.cok9=9 shace=32:enter=13
410 MODE 0
420 PEN 1:LOCATE 7:1 FRINT"Hmstrad" PRINT" Scribble Program"
430 PEN 2-LOCATE 1/6:PRINT"Press":PRINT:PRINT"Ur"
440 PEN 15-LOCATE 7.6 PRINT"FIRE BUITON":LOCATE 4.8 PRINT"COPY KEY"
450 PEN 4:LOURIE 1:11:FkIN: Use cursor keys OR Joystick to draw lines. Back9
round isalways FEN 6 i.e. NO CULCOR MESSAGE"
460 PEN 9:PRINT:PRINT"SPHOE BAR - CLEARS
                                                       SEREEN" PRINT : PRINT"ENTER
KEY - CHANGES
                          MUDE
470 PEN 3:LOCATE 4:24:PRINT"By D & B Lewis"
480 IF CINKEY time JEDIT AND INKEY COPY JEOTT FIRM 480
490 IF INKEY() ins /=Pressed THEN changecolour=76:uP=72:down=73:left=74:right=75
    ELSE champecolour=9:uP=0:down=2:left=8:right=1
500
       RETURN
```

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# Starry, starry night

A program of immense magnitude for the Electron by John Beckett

bservation of the night sky will reveal that the stars are of unequal brightness. This brightness, or magnitude, of a star depends on its distance away and its luminosity. The system of of stellar distance corresponding to 3.26 magnitudes is related to a precise logarithmic scale. Each magnitude differs from the next one by a factor of 2.812; therefore a you will find that its apparent magnitude is first magnitude star is 2.512 times brighter than a second magnitude star.

magnitude - 1.4. Care must always be taken be the brightest star as its apparent magnito note the difference between a star's tude would have changed, although its

apparent magnitude as we see it at its true distance from Earth, and its absolute magninucle as the star would appear at a distance of 10 parsecs from us. (A parsec being a unit light-years).

For instance, suppose you observe Sirius, - 1.4. By calculation, we find that its absolute magnitude is 1.4. Therefore, if Sirius was say The brightest star in the sky, Sirrus is 40 times its distance from Earth, it would not

absolute magnitude will stay the same. This makes the calculation of the absolute magnitude very important in astronomy.

The program consists of three main procedures.

Proclatro is a simple text introduction of the concept of absolute magnitude,

ProcDataEntry asks for the distance of the star from the Earth (either in light-years or parsecs), the name of the star, and its apparent magnitude, assigning each its own

Finally, ProcCalculate works out, then prints the absolute magnitude, using the equation in Line 370.

So, the program will work out the absolute magnitude of any star, as long as the distance (in light-years or parsecs) and the apparent magnitude from Earth is known.

```
LOREM Absolute Magnitude/Electron
20REM John T W Beckett 1984
300N ERROR REPORT: PRINT" at line ": ERL: END
40MBDE6: VBU19, 0, 4; 0;
SOPROC INTRO
SOPRUC DATA ENTRY
70PROD CALCULATE
801NPUT? "Do you wish to run this program again" YN$
901F LEFT$(YN$,1)< "N" AND LEFT$(YN$,1) → "Y"VDU7:GOTOBO
100 IF LEF1$ (YN$, 1) ="Y" THEN 40
110IF LEFT# (YN#, 1) = "N" THEN END
LEODEFPROC_DATA_ENTRY: CLS
130INPUT "Enter stars name "SN#
140 F LEN(SN#) >40 VDU7: GOTO130
150INPUT" "Enter stars distance "SD
1401F SDK1 VDU7:60T0150
170PRINT' "Enter unit of distance" "L=LIGHT-YEAR
1801NPUT U#
1901F LEFT$(U$,1)<>"L" AND LEFT$(U$,1)<>"P" THEN YOU7:GOTO180
2001F LEFT$(U$,1)="L" SD=SD*0.3068
2101MPUT: "Enter apparent magnitude "AP
2201F AP>1000 VDU7:GOT0210
230ENDPROC
240DEFPROC_INTRO
            CALCULATION OF ABSOLUTE MAGNITUDE"
250PRINT* "
260PRINT'' The absolute magnitude of a star is the
270PRINT "magnitude which a star would have if"
280PRINT' "put at a distance of 32.6 light-years"
290PRINT "or 10 parsecs from us. It is a measure"
300FRINE "of the real brightness of a star."
ALOPROG SPACE: EMDPROC
SZUDEPPROS SPACE
[30PRINTTAB(4,23) "Press 'SPACE BAR' to continue";
340REPEATUNTILGET=32:ENDPROC
3509EFPROC_CALCULATE
 360@%=&2040A
370AM=AP+5-5#EGG(SD)
380CLS: PRINT? "THE ABSOLUTE MAGNITUDE OF "SN$
 390PRINT" IS "AM: ENDPROC
```

# BEWARE. THE CYCLONE



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# GUIDE TO THE UNIVERSE PART 1 Not just a game... more a way of life **48K Spectrum** £7.50 Software by canta





# The inner depths

Keith Poole concludes his QL Disassembler, the program that reaches parts other programs miss

he QI. Disassembler is a program which will show you the inner depths of your QL's memory. The first part of the listing was printed last week, the remainder follows below.

### Program Notes

The main loop in the program consists of a select statement, which calls the procedure associsted with each instruction group.

The procedures Group O to Group a decode each group of instructions as defined last week. Group m handles move instructions. User deals with the two user definable instructions (Group a and f) by printing idel. It assumes that these instructions take up a minimum 2 byte op-code.

The two functions Addin and Raddin decode the addressing mode of the instruct on using two arguments reg and mole. Some instructions only use a subset of these addressing modes, so raddes checks for these before calling addres.

Dec takes a hexadecimal string argument and returns the decimal equivalent. To use this function, remember to initialise a variable digits with the value 0123466789ABCDEF. The function can handle upper or lower case letters.

Hear performs the opposite to Dec. It takes a numeric argument and returns a hexadecimal string.

Slice takes a bit slice from a number supplied, (eg. slice (240,2,3) returns a three bit number starting at bit two.

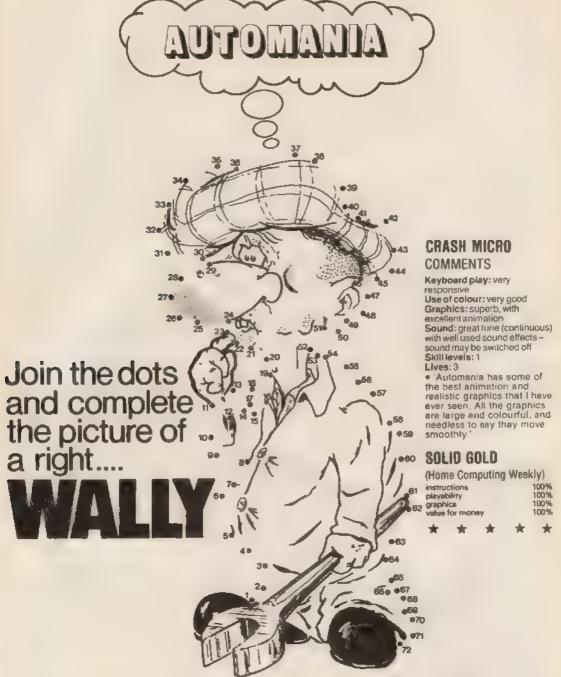
Croup 4 contains the miscellaneous instructions, and so is the most complex ## the procedures. To simplify it, two subgroups Sub8 and Sub14 were given their own procedures.

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Continued over the page

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   4120
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   4170 op-op-2:RETurn 256-PEER (w*on-2) +PEER (*+op-1)
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5390 FAINT CHRITPECK (64:1):
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IF 072000 DIV 8 THEN UDI=off@ _dr8;
dmd DIV 2:ama DIV 2
                                                                                                                                                                                                                                                                                         54 90 (25 E) (2)
57 19 (40 T) 59 H1
59 59 END FOR (4
  4540
 Auto
                                               END FOR
                                                 .ps=costoti
  LARE
                                                                                                                                                                                                                                                                                          Sw54 100.
 4470 END TE
                                                                                                                                                                                                                                                                                          5440 END DEFILIE
 4681 END 1F
                                                                                                                                                                                                                                                                                          9999 PDFE_W dec("3eff2"),dec("23c0")
 4690 ELSE
```

Watch out for Wally in a dream of a Program, Pyjamarama.



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# Beneath the surface

Journey to the Land of Giants and repel borders on the CBM 64, programmed by Steve Phillips

alien mini-subs. Your only defence is broken? is to hurl rocks at them, as they The program features full instructions G - Cap between each new position of ship advance beneath the surface. Can you and self-explanatory Rem statements.

the Land of Cianta is under attack from destroy them before your defensive wall BN-Bonus

Program Notes

C - Ship position

X - Rock X co-ordinate Y - Rock Y co-ordinate

SC Score

CL-Ship colour

```
ig obset sign kurter lile midder.
                                               755 PRINT TRECSON "10."
800 REM###POKE SEPTITE POS N###
SHE DEMORABHIN LOUDERS
                                              828 POKEV+2,0+K+0F+256:POKEV+3,Y
THE GOSUBLOS SUCCESSOR OF LAST SEA 1997
200 REMARKSE' CONTROL CONTROL CONTROL
                                             840 1F(PEEK) V+30 (ARTO) = 3THE NOOSUBZERS: 005UBZERS: 005UBZERS: 005UBZERS: 004
                                               850 OF=0-RETURN.
요한 등 사람들이 아니다.
교육 등 사람들이 아니다 그 아니는 그런 생활을 다
                                               960 REMARKNOVE ROCKSAN
                                               920 GOSUBIO00 IF UU=1 THEN RETURN
250 FOKE882+1/5 NEXT
270 POREV+28,2 POREV+30.1 POREV+37.17 PORE 930 %=%-0.7=1NT(9**%/E M2)+M 940 0050B1100
                                               950 IF YU255 THEN METURN
300 REM###SET UP SPRITE 0 (SUB)***
                                               960 00808800
310 PONE2040,14
                                               970 IFUU-1 THEN RETURN
320 FOR 1=0 10 62 READS
                                               980 00T0920
340 PULESSETTIS NEXT
360 POREV+21/3 POREV+30/0 POREV+30/0 PORE 1000 PEM***MOVE SUB***
                                               1010 C=6+G
VALUE RETURN
                                              1020 IF CD170 THEN GOSUBAGO
400 REMARKSURFACE SUBWER
410 R=R-INT (6/2+1)
                                              1050 IF CUZOU THEN GOSUNGGOOD
                                              1060 IF USO THEN RETURN
420 1F R4208 THEN F=208
                                              1070 POKEY, 1 RETURN
1100 REM***CHECK IF MSB PERMIRED***
1110 IF: R+03/256 THEN POKEY+16, 0
430 POKE V+1, R:RETURN
450 REM###SUBMERGE SUB###
460 FOR P=208 TO 250 STEPO.!
                                              1120 IF CHOODESS THEN POREVAIS CREEK
470 PORE VALUE
                                              * V*16 () QR2 QF#1
480 NEXT : PURE V. 0 PETUPN
500 REMARASELEUT SHOT###
                                               1139 RETURN
$20 IF PEER 1970=4 (HENM=8) 0=200 : 117 0 1200 REN+*FIRE SUBS GUN***
436 0=6:00 (Uni)
                                              1220 IF PEEK (1848+J)=160 THEN POKE1848+J)
530 IF PEEKK1977=5 THEHM=82 0=232 Nation E
=27:D=5-PETURN
                                               32:FOR 7=1 TO 50 BENT 1=1
                                              1240 IF PEEK (1808+J)=160 THEN POKE1808+J.
540 IF PEEKC1970=6 THENN=83 0=255 (353 E
                                              32 POME1848+J. 168 I=1
ago Da4 PETURN
550 GUSUB1000 FOR T=1TO HATESS, No FINNEY
                                              1255 IF I=1 THEN RETURN
NEXT GOTOSZO
                                               1280 PORE1848+J, 100 PORE56120+J. 8
600 REMARKERINI SCENERA
                                               LOG IF J=0 THEN GOSUBB400
1209 POWE1848+J.32
610 PRINTTHB:300:"# 🖃"
                                               1919 IFO+MUDIT THEN GOSUB938
620 PRINTTAB(7), "♠♠♠₽ ₹ 7", (AB) 30 · "
                                              1826 F=381 GOT01220
                                              1400 REMARKILL GIMNIAAR
                            TO THE TO THE THE TRANSPORT OF THE STREET
638 PRINTTABE 5. . " P
640 PRINT"DD - - - - - - - - - - - - -
                                             1420 PRINT THE (36), "...
                                              1430 FRINT THE BOOK # # 🗒
650 PRINT":38- -
                                              1440 PRINT TAB(36)," X
1450 PRINT TAB(36),"X
- (6)
670 PRINT"D -
                                             1460 FOR T=0 TO 14
           ...
                                             1478 POFESBERT : NEXT
680 POKESSZ80.5 POKESSZ81.6 POKEZOLU 160 .USO POKESSZ81.6 POKEM.0 POKEA.0
PONES6295, 101RE1UMN
700 REM***FOSITION NEW ROCK***
                                               3494 PUREZBO REE129 NTE45 BE3 GOSUB1600
                                            1500 PULLY TO BOKEN O POKEN O RETURN
150 - VEN***SOUND VOICE 1 V***
.610 FUR U=15 TO B STER-1
710 0=160 N=157 Y=175 (U=0 POREV+00.0
720 GOSUB1100 GOSUB300 RETURN
740 REMARKADINI GROUTERS
740 REM###PRINT GIRNT###
                                              16am IF 06200 THEN POREVESS,U
756 FRINT" Heldelelelelelelelelelelelele"
                                                   PURELLE PORFULAR
```

```
1986 PUNEH, 53 PONEH, NTE PUNEE, 65 3050 PONE198,0 WRIT198,1:0=0:RUN30 100, POR D=1 To TUR NEUT 3100 REM###11TLE PAGE###
HATT REAT PETURN
                                                                                  $128 PRBH THB(10)
                                                                                  3130 FRISH "SMINI-SUB COMOUEST"
 (1997) 厚层图案中中国红色版(1997—30国务会等
                                                                                 3140 PRINT TABCIDE, "S#######################
 819 POFEV#3.255 UU-1
                                                                                  2150 PRINT" ENTHE LAND OF THE GIANTS IS
 |829 | [U]P=25 | NTE=2 | 88 | 840 | 0090515099
                                                                                UNDER OTHER
 ស្ត្រីការ ស្រ្តា ភូឌី លោក ស្រាក្នុងស្រុ
                                                                                    3160 PRINT"ENOM HLIEN MINI-SUBS.AS GIANT
E. OF CONTRACTOR REPORT
                                                                                 LEADER.
JACON REMARKS CASH SUB-CUBUSARA
                                                                                  3170 PRINT"YOUR ONLY DEFENCE IS TO HURL
1-10 FOR ZE1 10 15
THAT FOR -1 TO 18 MEST
TO POLEW+35/1 MEST
                                                                                HUGE ROCKS"
                                                                            3130 FRINT"AT THE SUBS AS THEY HIVALD.E
1900 POKE VIE RETURN
                                                                                  JUST BENEATH"
STUDY REMARKSCONTRICATA
                                                                                   3190 PRINT"THE SURFACE."
24/11/10/2014 (2004)
                                                                                  3200 PRINT"YOU SCORE 200 PTS FOR EACH SUB
(*) - 100 [NT" ##6" (5PC - 7 + SC+EN | SC = SC+EN
                                                                                  POIN H"
D210 PPI'97"BORDS WHICH INCREASES BY SO PTS
2.1. 16 BH438种等级
Child Table (0000) PST FOR THE FORM
                                                                                  BOR ERCHHII.
  3320 PRINT MEOR LONG THROW, PRESS NEY #F18"
THE PRESENT PRINTINGS OF STREET
                                                                                  DOBN FRINT MFOR MEDION THROW FRECO 184
11.0 FRIER "MU" (SPL) (25) BH
21 31 RL TURP
                                                                                   3240 PRINT" NEON SHORE THROW PRESS SEY
CLUB RENAMASCORE, BUNUS USARE FOR **
                                                                                 □ = 19,00°
                                                                                    3250 PRINTINGE MINUS NETS THROUGH TO WHELL
 COLD PRINT MESSORE OF CPS CO. TEGNUS. OF SUPPRILE
                                                                                    3260 PRINT"AND DESTROY PERT OF YOUR
 J. W FEINT"
                                                                                  DEFENSIVE WALL.
2.70 FRINT THE BONDS IS THEN RESE!
2.70 FRINT THE BONDS IS THEN RESE!
2.70 CT-CT*: HB-S*:PTT*:TTG*
2.50 FRINT HB*FRID IO
2.50 IF F40 THEN CL-104!

                                                                               4140 DRTA 0.28.0.0.28.0.38.205.128
4150 DATA (25.295.192.127.182.22)
4160 DATA 127.255.192.33.255.128.0.0.0
4170 DATA 0.0.0
  CHARL GUSUBI600 RETURN
    439 GUGUBI600 RETURN
COO REM***DELAY BETWEEN SUBS***
520 R=225 POREV+1/R
 2520 R=225 POREV+1.R
 2830 PHINICENDOLD#7:
  1540 IF POS THEN CHA RETURN
    150 C=-INTXP#10#60 RETURN
                                                                                5800
                                                                                5010
  2628 UU=1 GUSUB1200 BN=0 GOSUB2100
  2630 IF J011 THEN GOSUB1400 COSUBBDOS 5020 REM+**************************
  2646 BUR=120:NTE=10:WF=123:B=0:605U01600 5030 REN################################
  2650 POKE W.0 POKE A.0 J=0
2670 IF0+XK317AMDYK255 THEN GOSUB930
                                                                                   与8448 民国州未来来
                                                                                  5050 REMARK MINI-SUB CONQUEST ***
                                                                                  5060 REM**
                                                                                                                                             水油井
  00102678
  2680 GOSUB460 GOSUB2800 GUSUB25J0 RETURN 5070 PEN*** BY STEVE PHILLIPS ***
                                                                                                                                             汽水库
                                                                                   5080 REM###
   BBGG RENEARORNE OVERFAR
                                                                                  SOOR REMARK COMMODORE 64
                                                                                                                                            9.83
   3010 PRINT"ING"
  3010 PRINT'IMW#
3020 PRINT TAB(12),"GAME OVER"
3030 PRINT TAB(6):"MMYOU SCORED":SC
                                                                                 5:00 RENEW+
5110 RENEW+ 2ND APRIL 1984
5120 RENEW+
                                                                                                                                             未未来
                                                                                                                                             并来来
                                                                                                                                             ***
   PUTMER
                                                                                  5130 REM+***************
   3040 PRINT TABLET, "MPRESS ANY FEY
                                                                                  OF MESTERT!
```



The three latest books on Sunshine's superb QL QLassics series are now available at your local bookshop or computer dealer. Let's take a look at the first one, Developing Applications on the Sinclair QL. It's full of practical ideas for making the most out of Quill, Easel, Abacus and Archive, for both your home and business. Ideal for both beginner and expert, Mike Grace's book gives you the knowledge you need.

Up till now, machine code programming on the powerful 68008 microprocessor of the QL was a daunting prospect. Andrew Pennell's QL QLassic, Assembly Language Programming, explains the internal structure, the register set and the many addressing modes – and includes the use of traps and exception handlers. Here are over 160 pages of vital data and advice for QL programmers, and all for just £7.95.

With the new Sunshine book, Artificial Intelligence on the QL, you can turn this already highlycapable machine into an intelligent micro. Your QL will be able to advise you, converse with you, learn from you – and even teach you in thing or two! This QL QLassic explains Al from first principles, and includes example programs and SuperBASIC programming. And all for only £6.95.

These three essential books for every committed QL owner are it your local bookshop or micro dealer now. Or use the direct order form here. And start applying your QL, programming your QL, and making your QL – and you – think, thanks to Sunshine's latest QL QLassics.



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Open Forum is for you to publish your programs and ideas. Take cars that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

### Windows

on OL

This program is designed to illustrate the Window facility on the QL. Four new

windows will be opened, one in each corner of the screen, covering the whole of the display area. In each window a different type of graphical pattern is drawn; these patterns are described below.

In the top left hand corner, filled circles

are drawn mandom positions in random colours. In the top right hand corner filled squares are drawn at random positions in random colours. In the bottom left hand corner filled ellipses are drawn and in the bottom right hand window filled triangles are drawn at random positions in random colours. A border is also set up around each window.

The program will Run indefinitely, and should be stopped by pressing Ctrl and Space together.

```
too Remark Windows By AMDREW FILEY
110 OPEN#5.scr_256:128a0x0
   PAPER#S-U+CLS#S
130 INK#5.1
140 BDRDER#5.15 1
150 SCALE#5, 100, 0.0
160 OPEN#6.scr_256:128a256x128
170
    INKWELO
180 PAPER#6.2:065#6
190 BORDER#6-15.3
200 SCRLE#6-100-8-0
210 OPEN#7-scr_256*1380256*0
220 TRK#7-0
230 PAPERMS. THUESMY
240 BORDER#7-15-5
250 SCALEWT, 100.0.0
280 OPERM8.scr, 356:13800:138
270 INKWS.0
```

# Arcade Avenue



### Room to move

ontinuing on the subject of fet Set Willy hacking from last week — here is Ben Caunce's table showing the memory locations of the various rooms.

TOUR INJURY	1001	I LID.
Address	(Harr)	Room Title
C000		Off Licence
CI00		The Bridge
C300		Under Megatree
C300		Foot of Megatree
C400		The Drive
C800		Security Goard
C800		Entrance to Hades
C700		Cuckoo's Nest
C800		Itsude Megatree
C900		Branch Over Drive
CA00		Front Door
CB00		Hall
CCOG		Tree Top
CD00		Out On A Limb
CE00		Rescue Esmeralda
CFeo		Seen This Before
D000		Quiricafleeg
D100		Battlements
D200		Pn Roof
10300		Forgotten Abbey

Baltroom East DOCO Bailroom West D600 Main Stairway D700 Kitchen West of Etchen D800 D900 Cold Store East Wall Bann DAGG DB00 Chapel DCoo First Landand DI000 Nightmare Room DEGG Banyan Tree Swamming Pool DECC E000 Half Way Up East Wall ELOO Bathroom E200 Too Landing Master Bedroom E300 Bat Of True E400 EB00 Ozanoszy E800 Priest's Hole E700 Generator Room E800 Dr. Jones DEED The Attac EA00 Under The Roof The Conservatory **2800** EC00 On Top Of House Under The Drive ED00 EE06 Tree Root NOT USED EF00 F000 Nomen Land Wine Cellur F100 F200 Watchtower F300 Tool Shed F400 Back Stairs Back Door F900 **FB00** West Wind West Bedroom F700 West Wing Roof F800 Above West Sedroom F900 The Beach FA00 FB00 The Yacht

The Bow

FC00

What I find particularly interesting is the room at EF00 which is not used. Using the information given in this article it seems not impossible that you could add your own room to the game. If anyone is clever enough to do this or even uses one of the 'JSW Designer' programs I memoned a few weeks ago, then I'll see about arrancopy then I'll see about arranging a small prize for the best 'new room'. Anyway let's go on with Ben's letter which has still more useful tips. "I have also found a hidden object on the First Landing which I impossible to reach without modifying the room layout. To alter the room and retrieve it as you walk towards the cross Poke 53642.0: Poke 56350.0: Poke 56357,170.

The following Pokes are also useful (some are necessary). Poke 42183,11 and Poke 59991,82 will remove the Attic problems (and Graeme Carrot also points out that Poke 59999,255 will do the same).

Poke 56876.4 improves the Banyan Tree layout. Poke 60231,8 improves the 'conser-

vatory' layout. Poke 50552,170 and \$0583,170 blocks off the Entrance to Hades' (who wants to go there?). Poke 50512,168; 50520,168 and 50628,170 puts a ledge in the 'security Guards' so that you can get under the Drive without going through the Forgotten Abbey. Poke 54814.0 removes the annoving 'star' on the Main Stairway. Poke 57411,160; 57362,26; 57464,170 makes life a little safer in Priest's Hole. The following Pokes make it possible to travel from The Bow to Off Licence and vice versa - Poke 64610,21; 64632,85; 64633,85; 64634,85; 64635,4; 49386,60; 49263,0; 49271,0,"

So thank you very much, Ben for that fascinating letter.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments from playing tips on difficult games or programs you'd particularly like to praise (or blams!) then write to: Tony Kendle, Arcade Avenue Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD

```
280 PRPER#8,4:0.5#8
290 BORDER#8. 5.5
300 SCALE#8.100.0.0
010 THE TROUBSOR 40,103:FLASH 1:CEIZE 3.1:PPINT"WINDOWS BY ANDREW FILBY":F
LBSH 1
120 REPeat loop
330 window_ L
340 wandow_3
350 MINDON.
360 window_4
370 END REFleat oor
380 DEFine PROCedure window_
390 (NK#5,RMD(0 f0 7)*FILL#5,1*C.#30.E#5,RMD(0 f0 149).RMD(0 f0 150)*RMD(0 f
G 50014FTH.015+0
400 END DEFine
410 DEFine PROCedure window_2 420 DEFine PROCedure window_2 420 DEFine PROCedure window_2 420 DEFINE #6.1.4 T
0 FH000 f0 1480 RND 0 f0 .00 f0 F0000 10 .480 PN() ) to 1000 f0 } asfill#6,
430 END DEFane
440 DEFine PROCedure windou_3
450 ARREDGO DO TOQUAR-RNO C.
                            THE PROPERTY OF
    mi FILL#7.0
470 END DEFINE
480 DEFine PROCedure Jindou 4
490 FILL#8:14 INKWE RHD:0 TO THICERCLEMS RHORD IC 1931 RND:0 TO 100); RND:0 T
8 SON-RNO-RHOCO TO (29P1) : FILL#3.0
500 END DEFine
```

Windows by A Filby

# Baud Walk



### Special interest

If you spend a lot of time trying occupated contact people on the telephone, you will have noticed that the chances are that only one in three calls actually get you through the person you want chait to.

And its even more annoying and expensive when you are making a long distance call.

Well, now the UK's cheapest electronic mail service — which was previously only available in London — has been extended nationwide.

That means that for the price of a local telephone call and a small subscription of £20 per year you can get on to electronic mail, send massages, greetings, arrange blind dates and talk to other baud walkers.

The system actually sits on the Prestel network and at only £20 a year its almost worth joining just to access the Prootel pages. There are at least another 10,000 micro users hooked up too, courtesy of the Micronet 800 service.

The electronic mail system on Prestel comes complete with a directory of other users and a number of special inte-

rest groups.

Every subscriber is given an individual 10-digit address number which you complete on pre-formatted pages — most message pages take up to 120 words a time.

Viewdata software marketed by a number of companies with their modems also allows you to prepare your messages before going on-line, thus custing out even more telephone costs. I use this malibox facility frequently to get in touch with people on the move or when I'm at home tinkering with my micro at midnight and run into problems. I have sometimes mailboxed somebody on the network. I know who might have the answer. Invariably next day there is their reply sitting in my mailbox store ready for me to use, save back to store or delete from the system.

The biggest advantage for baud walkers on electronic mail systems is the special interest groups. Nobody has yet devised a directory of category of index, that would be really useful. Imagine being able to mailbox everybody, for example, who was struggling with a particular adventure game - every one could help each other to solve the puzzles.

Imagine too, starting your own special interest group.

You could post the message on any one of Prestel's notice board services, collect the replies and from then on run your own chib, will via electronic mail.

The disadvantage of this cheap form of electronic mail is its limitations — but then you can't have everything Expect too, some report about junk electronic mail.

 Next week: the UK's cheapest 300/300 modern is launched.

Robin Wilkinson

Sand Walk is shaw weekly column with nows on networking, databases, reviews of moderns and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to. Robin Wilkinson, Band Walk Popular Computing Weekly, 12-13 Little Newport Street, London WC3R 3LD.

He can also be contacted on Prestel mailbox 01993727.

### Matrice

### on Vic 20

This unexpanded program should be easily adopted for any Basic speaking machine. It consists of two programs which are joined together. Each one can be used separately.

(1) The first program is located between lines 90-940 (and includes the subroutize in

1600), It allows you to enter a matrice and it will calculate the determinant and the inverse matric.

(3) The second program is located between times 970-1430. It will multiply 2 matrices given by the user.

### Example

3x+8+z=1 z+2y+3z=012x+3y-z=1 Type 'I' to get the first program. The computer will ask you the size of the matric which is here 3.Type in 3.Then introduce 3/6/1/1/2/3/2/3.—I You'll get I as determinant of the system. Then you'll get the inverse matrix.

Press 'l' to go on with equation of any offer key to stop. If you pressed 'l', you are asked for the 3 numbers following the sign which are 1,0 and -1. Enter them and you'll get the result.

```
cen seessaaaaaaaaa
                                                             210 b(l,c)#a(l,c)
  nem # matrices
                                                             220 pesto
  L-640 南南非田安华米東中华南山南非
                                                            230 next!
                                                            240 rem results-inverse matri:
 nem * copyright
                                                             260 Print"M"
5 rem # cyril aubry #
图 仁母切 中市市水水市市市中市市市市
                                                             278 For9=1ton-1
                                                             288 90sub1580
  ram # october 188 #
8 cam Milesbandandeven
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9 Printchr#kIA/
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# The Music Box

### Sound chip

e all know about the revolution brought about in the few years that followed Intel's introduction of the first microprocessor chip—the antique 4040, best known as the progenitor of a million games of video tennis. The 4040 is now seen with something approaching religious awe.

As far as computer music is concerned, similar veneration probably awaits another chip—General Instrument's AY-3-8910 which, along with its somewhat less elaborate stablemate, the AY-3-8912, was probably the first fully digital programmable sound generator to reach the market-place. The 8912 is built in to the Oric 1 and Oric Atmos, while the 8910 is the chip chosen by the MSX manufacturers for their standard sound output features.

These chips have been po-

pular with home constructors for some time, as has the Texas Instrument's near-equivalent, the SN76489, which is the chip used in the BBC micro to produce sound.

Most current PSGs are fairly simple devices. The 76468, for example, isn't even properly addressable—it is, effectively, connected to an eight-bit data bus and the registers within it (the three tone generators and one noise generator) are addressed via this bus. If the chip had to have a large number of facilities, such an approach would be impossibly time consuming.

As a result, the features of these basic chips are extremely limited. Nonetheless, the principle of the PSG allows us, in theory, to produce an entire synthesiser on a single chip and to control it from software.

The most advanced PSG in common use is the Mostek 6581, available only on Commodore machines. Commodore Basic, being what is is, makes handling the 6581 an extremely tedious matter (there are 29 different registers in the chip which must be individually Poked or Peeked to make anything happen). But then there are an increasing number of hardware and software add-ons to enable you to get the most out of this remarkable chip.

Just one item of news in this connection. The designer of the 6581 was a certain Bob Yannes, Bob left MOS Technology (the Commodore-owned company which produces Mostek chips) some time ago. Recently, he and his brother Dave have surfaced at the helm of a company called Peripheral Visions Inc. (Great Valley Parirway, Malvern, Pennsylvania 1935S, USA). FVI have just announced an Apple add-on called the DrumKey - apparently everything you ever wanted from a drum synth and selling at only \$£39.96.

Percussion synthesis is certainly one of the current things for the serious computer musician and it will be interesting to see whether the DrumKey (which includes a new Yannesdesigned custom chip) comes up to the same standard in this area that the 6581 has set in the PSG field. To hear the device at 3000-miles' distance, you can ring 0101-215-647-3930.

Gary Herman

The Music Box is a new weekly column with news, reviews and readers comments on all aspects of micros and music.

Any readers with experience of computer small making or companies with new product news are invited to write to: drop a line explaining what they're doing to: Cary Herman, The Music Box, 12-13 Little Newport Street, London WG2R 3LD.

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# Microradio



### Answer back

large number of readers have enquired about radio teletype (RTTY) programs for the Commodore 64 computer. More and more radio software is coming along for this machine and about the best RTTY program I have seen comes from Grosvenor Software of 22, Grosvenor Road, Seaford, East Sussex, BN25 2BS.

The program's title is RTTY Transceive for the Commodore 64 and is available either on cassette at £14 or disc at £18. Written entirety in machine code, the program is

professionally presented and includes extensive instructions on how to use the facilities available, and there are plenty of those. In addition to the program, the user will need a suitable RTTY terminal unit interface between the computer and the radio. Many of you will already have one, but if not a unit including all leads is available from PNP Communications in conjunction with Grosvenor. Ring 0323 893378 for more details.

The program operates in split-screen mode. This means that in-coming messages are received at the top part of the screen and you are able to compose a reply during receive, the reply being stored in a 1000 character buffer and displayed in the lower half of the screen. When you are ready to transmit you press a key and out goes your response. You can type ahead during transmission or you can send previously prepared pages of text which can be stored in any of ten memories of 480 characters.

The selection of baud rate is software controlled between 20 and 250 baud. This will cope with just about everything in RTTY. The really cunning thing about this program is that it will tell you the baud rate of an incoming signal. I found this very impressive, it is something I have never seen before in such a package and is typical of the attention to detail displayed throughout.

Other features include automatic answer-back for radio mailboxes, in-built call-sign of user, the ability to remember all received and transmitted messages for later review. The function keys on the 64 are used for control of the major aspects of the program such as receive, transmit etc and a real-time clock is constantly displayed on screen and is available to send. On the whole this is a well thought-out program which is both efficient and easy to use. The features of the Commodore 64 have been used to full effect indicating that it has been written specially for the 64 and not cobbled together from a bunch of routines intended for something else.

There is a great deal of radio software appearing recently but I can honestly say that very little of it compares in features or quality to Grosvenor's RTTY for the Commodore 64. Here we have the unique combination of the ultimate in radio software along with excellent value for money. Another winner from the suthor, M J Kerry GARME.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiaatis alike. If you have any queries that you want answered, hints and tips to share, at topics that you would like to see covered, writs to: Ray Berry, Microradio. Popular Computing Weekly, 12-13 Lillie Newport Street, London WC2R 3LD.

# Tony Bridge's Adventure Corner



### Rubic's cube

lthough we still have a lot of new adventures to get through (they're coming in thick and fast now - but should we complain?), I'm going to put them on one side for a week, and give some badly-needed help.

Now that the infocom adventures are at last available for a reasonable £11 or so (although, of course, only on disc drive don't hold your breath for tape versions, it's probably not possible!) many more adventurers are being introduced to the delights of the Zork Triology, Planetfall and Deadline among others. Mr D Feal of London N1 went out and bought the whole trilogy. Zork I brings the following problems with it: "How do I pass Hage's entrance? 11,29 and 41. "And how do I open the granting in the forest?" You'll need the 32,16,46,46.

As for Zork III: "What is the secret of the Puzzle Room? A difficult one to answer, Mr Feall Suffice to say that the whole thing is rather like a giant Rubic's Cube, and the minimum number of moves - worked out with the aid of an algorithm constructed by Ken Matthews and friends - is 60 moves. The end result must be to move a ladder beneath a hole in the ceiling. "How do I get the Crown Jewels?" You only need a small item from the Jewels, but 34,5,27,42. How do I get across the lake without getting my lamp wet?" 6,38! "How do I get through the rubble? "34,28,14,19. "And finally, I keept coming across a Viking ship with an old

sailor on it. How do I board the ship?" This is a lovely example of why the infocom adventures are so much more interesting than most others: in Zork I, the player will find a book, in the temple. This says "Beware of saying Hello Sailor"! Working through the trilogy, one cannot resist the temptation, of course, to say just that at every opportunity! So, at this point, there's only one thing to do, isn't there?

As for your question about where to get hint sheets for Infocom games, my copies of the Infocom games (which I bought for a long time age for, unfortunately, rather more than £11), go into great detail about the Infocom Hint Book and Nifty Map for each aciventure - they're \$7.95 each (plus tax and postage). Unless the Commodore versions are very different, you'll find the address in the documentation.

Mr R A C Garroway, from Swindon, has invested recently in a disc drive for his CMB64, and a copy of the complete trilogy. He has collected 16 of the 20 treasures, but is now stuck. You've done very well, especially in getting the pot of gold and the hage diamond, but it is the jewelled egg which is holding you up now. There is a treasure lying within which you cannot get out - you'll need to get someone else to do

the job for you, so 12, 26, 44, 16, 20, 46, 3, 36, 26. Incidentally, have you looked in the buoy, in the river?

From a trilogy on the Commodore, to a trilogy on the Spectrum - the Ket Trilogy has won an awful lot of fars, all trying, no doubt, for that video recorder that is the prize awaiting the first person to finish the Final Mission (if you see me wande-

ring around with a load of smelly old hav. cive me a wavel). David Bryan writes to me from Middlesborough about the first two parts, Mountain of Ket and Temple of Vran. In the first, he asks: "How do I get past the skul?." This is the final puzzle, David, as you may know. Although you say that you have got many objects with you, only three are

needed - 46,10,39,16,13. You'll find the first in the south plateau, the second in the little-used room and the third in the mountains. As for the rope in Temple of Vran, tell your Dad, David, that he needs to 34.7.2.16.21.48 - then he rope and down. Lords of Time about which I have had many letters is still a great favourite, and I shall devote a whole page to this great program soon. But for now, let me address just a couple of problems. "I must congratulate Sue Gerrard on the most exciting adventure game that I have tackled," says Mrs M Roberts of Pickering, "How do I open the door to the invention room on zone 3?" 47,22. "Can I do anything with the Viking longship? 49. "Can I get past the acorpion, squids or seaweed in zone III And where is the treasure trove, mentioned on the parchment?" 49 and 35.8.34.24,16,50. "How do I get rid of The Black Knight and where is the sharp sword in zone 5?" 1,43,7,37 -46, 18, 33, 23, 1, 26,

Finally she says: "In Artic's Golden Apple, what do I do with the computer?" Just think of what the deranged parrot is saying, and

Finally, the clue I gave to complete Tample of Vran - two weeks ago - was actually the clue to complete Mountains of

KET -SCORE=1% We are maar a door in the east wall. It is 8' tall ade of thick oak, There is glass window above it, tall and

DOOR DOOR

It is locked!

MUDDINE WINDOW

Yep! It's a glass window!

BREAK WINDOW

You cannot reach the glass.

Ket. You must have the Magic Sword, the magic Armour, the Magic Ring and the magic Wand -- drop everything else.

Cine Words: 1 Give & Cliff 3 Thief 4 Get 5 Back # Drop J To 8 Stone 9 Time 10 Hat 11 Bell III Carry 13 Beard 74 Before 15 From 16 And 17 In 18 Snow 19 Earthquake 20 Let 21 Feed 22 Eurekal 23 Will 24 Up 25 Down 25 It 27 Into 25 Through 29 Book 30 Crossing 31 Machine 32 Key 33 Queen 34 Go 35 Push 36 Nick 37 Prince 38 Lamp III Clock 40 Before #1 Candle 42 Part 43 Sword 44 Around 45 Mare 46 The 47 Say 48 Elephant 49 No! 50 Easy.

This series of articles is designed for novice and expenenced Adventurers aske. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pittalls you can expect to encounter. So, if you have an Adventure you and reviewed, or if you are stuck in an Adverture and cannot progress any further write to: Tony Bridge, Adventure Comer, Papular Computing Weakly, 12-13 Little Newport Street, London WC29 SLD.

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# Peek & Poke



### Morse translator

C Parkes of Southend writes:

A few weeks ago your
magazine published an
address relating to a morsecode translater.

grateful if you could either re-publish it or possibly send

It to me.

The program to which I think you refer was reviewed in the Microradio cohum in Vol. 3 No 22 (31st May). It is available from: Pinehurst Data Studios, 69 Pinehurst Park, West Moors, Wimbourne, Dorset BH22 0BP. The price for the ZXB1 version is £7.00. I do not have a price for the Spectrum version.

### Columns of keys

Robert Somerville of Dumízies, writes:

Q I own an 18 month old Spectrum, which is now out of guarancee. I wish to purchase a new keyboard membrane for it, as a column of keys has stopped working. Could you give the name of a company that would supply these membranes by mail order?

The Spectrum keyboard is certainly the weak link in this particular Sinclair chain. Perhaps you should consider buying one of the excellent replacement keyboards.

If you want to stick with the original, you will be hard pressed to actually buy one, as it has become Sinclair policy to discourage shops from selling Spectrum components direct to third parties. However, mumber of companies can re-

place membranes, one of these being RA Electronics, who can be telephoned on 0502 66289.

### Picture quality

Richard Bennett of Tarporley, Cheshire, writes:

of adverts recently for units which enable the Spectrum's sound to be fed to the TV speaker. As they are about the same price as amplifiers I was wondering whether they are as effective and whether they affect picture quality?

A By and large these units are not as effective, on their own, as an amplifier. They usually use the TV amplification system and merely feed the computer sound signals through that. As they utilise the normal TV sound system they will have no effect on picture quality.

### Spectrum queries

David Cowler of Hemel Hempstead, Herts writes:

After having just finished reading PCW, I felt that for the first time ever in my two years computing, I must write to a computer magazine. I have a number of queries which compelled me to write to you about my Spectrum.

1. How do you disable

2. How do you disable List?
3. How do you disable Save?

4. Is there any way of testing to see if the Break key is being pressed?

5. What is the best available book (or cassette) which thoroughly explains Spectrum machine code?

A Phew....
OK here we go.

1) Break is normally disabled by setting the Err Sp system variable to zero. This causes the machine to New if Break is pressed during the running of your program.

My favourite method of disabling List is to scramble the keyword tokens in the character set. That is, change the Save keyword to Load, change Letto List, etc. This produces such a mucked up listing as ■ make it unusable.

3. Basically, if someone has broken into your program then disabling Save is not realily going to achieve very much. By far the best method of achieving program protection is to disable the keyboard scanning routine, and do impressing of keys yourself.

4. The ROM routine at 1F54 tests for the Break (and also for Shift and Break). It is a very small routine and can be used from within one of your own

programs

5. 280 Language Programming by Lance Leventhal is one of the most comprehensive works on the subject.

### Which system?

K D Ouneridge of Didcot, Oxfordshire writes:

My problem is probably not a common one, but I should be very grateful if you could belp me. Having been using main-frame computers for acientific computing for 20 years of so, and having recently retired, I should like to buy a home computer to continue some of the projects (using Fortran translating to Basic) which were never finished at work.

The problem is that I have costed my requirements — word processing, disc drive (single or double), at least 64K Ram, preferably a 16-bit processor, cassette recording capability (compatible with T199/4A), good graphics and colour — for several different systems, including the BBC and the total always seems to amount to around £1300.

I have an aversion to the Commodore 64 which would be less at £800 or so. It eventually penetrated my shull that a small business computer might suit me, and

the two models I came up with are: Sanyo mdel MBC 555 — £1148 with 128K and twin disc-drive and the Sanyo model 550 — £862 with 128K and single disc drive. What do you think?

Well...you obviously know what you want now all you have to do is find it.

Of the two Sanyo machines you mention — which seem quite sensible — my preference would be for the MBC 555. The double disc drive gives you the ability — copy disc — disc (for security) and also increases the amount of on-line data storage at your command for work proces

If is extremely unlikely that you will be able a achieve TI 994/A cassette compatibility, no matter what system you buy. So, unless you could write a machine-code program to read and list the contents of a TI cassette, or borrow one, I am afraid you have had n.

One last thought, as you are converting Fortran programs, why convert them to Basic? If the Sanyo computers have a Pascal compiler available you might find that that conversion was less presente, and that the programs ran a lot faster than with Basic.

### Modem plug-in

Wendy Best of Nottingham, writes:

1 own a Vic20 and I would like to buy an inexpensive telecommunications modem in plug in the back. Could you tell me how much they cost and where I could get one from?

The Maplin modern at about £40 is probably the cheapest way into the communications area Maplin also provide an interface to allow this modern to be connected ■ the Vic20 (via R\$232C). You can contact Maplin on 0702-552941

The modem comes in two forms, either as a kit or ready built.

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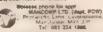
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SPECTRUM Software for sale all as new Hobbit, Quill, Atic Atac, Doomsday Castle Hall of Things etc. All half price many more, all original. Tel: Liphook 722591 (Hants)

SPECTRUM software to sell: Lunar Jelman £4 Imagine Titles £3 Plus others all originals. Contact:- Graham Pugh II Ascol Close, Ely, Cardiff, CF5 58E or Ring 0222 552292.

### Ataris for Sale

ATARI 800 + disk and loads of s/w Cost over £1000. Sell for £800 one. Or maybe swap for CBM 64. Tel: Bracknell 57659

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ATARI 800 48K data recorder. Plus vast number of gumes manuals with boxes. Not very old. Excellent condition. Quick sale, £250. Tol: (021) 783 2500. FOR SALE: Alan VCS, Joysticks, Paddles, 6 games sell for £50 or swap 16K Spectrum Phone: 79301 (0422) ask for Adnan after six pm.

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BBC pair of self centered loysticks and nine disc three of which contain games like Planetoid, Monster, Meleors, Sell for £30. Tel £51 327 2155 after 5pm. ACORN ELECTRON plus Monsters, Meteors, Starship Command, Tree of Life, Complete Money Management, Chess, Killa Gorilla + more + manual and program books £180 Tel. 01-699

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BBC Football Manager, Snooker, Fortress, Frak, Mr. Wimpy, Battle Planet, 3D-Grand Prix, Dictator, Sweep, Chuckle Egg, 3D-Bomb Alley, Trench, Carryon, Hunchback, Wizard, Killer Gorilla, Granklin's Tomb, Vortex, Champions £3 each. Originals only -- no copies. Tel: Fainham Common 4310. ACORN ELECTRON plus-1, books mags and software including Hulk, Killer Gonife, Chess, Escape from Moonbese Aipha, Pettigrews Diary Worth £520 Sell for £399 Have to collect Phone David 0272 839926.

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SHARP MZ700 plus cassette and prior ter plotter 4-colour built-in plus software £250 no-offers or swap for portable computer HX 20 Tandy 100 etc telephone Sherheld 471160.

D.K. TRONICS light pen 4-0 version hardly used fully based with booklet tape and interface for ZX-Spec. Worth £19.95 Sell for £12.00. Tel: Chester 42236 ask for Brett

ORIC-1 48K + £85 s/w + £45 books. The lot £145 one. Contact Gary Morns 21 Levens Drive Breightmet, Botton 3L2 SE.L

MELBOURNE HOUSE games for sale Sharlock £12, Mugsy £4, Hurg £9 or the lot for £23 one - phone David on Brentwood (0277) 223666 after 4pm. T199.4A COMPUTER complete with joysticks, cassette leads, instruction - very good manual plus two dumes condition - £50 one Tel Adlington

(cede 0257) 481707 - evenings. MZ 700 SHARP + cassette printer s/w + cables, £250 ono, Tel: work, Reading 583811 ext 247 or swap for

Commodore 64. Mr Nott. S100 MODULES 8K static Ram 4K fitted video display module, 280 CPV, social parallel port, analogue display board complete video input + scan coils. I.C.S in holders. Offers Tel:

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T1994A + extended Basic + VHF + UHF coverters. 299 Tel: Nottingham 0602 62592

2X PRINTER with 5 unused rolls of paper + Instructions £34.00. Tel. Dr Culion 021 449 1350. (7-10pm).

SENSORY 9 chess computer. Cost £165 open to other. Tel. 0302 49475 or

TRS 80 model 3 upgraded, 32K books, tapes, games etc. Built in V.D.U. Tel: 01 363 7866 1250

ORIC ATMOS 48K six months old. Inc tape recorder £100 or swap for Pentau carnera lenses or portable keyboard of similar value. Tel: Wattham Cross

NEWBRAIN HODEL A - books + 5/1 £150 Compalible recorder £15. Tel. 0530 70600 eves.

SINCLAIR QL, latest J.M. version + printer, cable and mags. Hardly used. 0375 one. Tel: Andrew Stoke-on-Trent

MAGAZINES, Pursonal Computer News 1-51, Sinclair Programs 1-16, ZX Computing 1-11, Your Computer 1/3-4/ 5. Sinclair User 1-24. Offers to Tony, Tel: 01-864 2414 (evenings), 01-278 1001 (day)

GRANDSTAND VGS, two Joysticks. two cartridges, PSU - £25 Tel: 0272 886162 after 5pm.

ALPHACOM 32 thermal printer plus one roll of paper, only five months old. Spectrum compatible, £43, Telephone Shrinwsbury 59356

FOR SALE: Fox programmable joystick interface with Quickshot one joystick (10 months old); plus Currath Microspeech (3 months old). Any offers? Phone Vince on 01-866 2931 after 5om weekdays, or weekends EPSON HX-20 complete with case.

petional controller for TV link manuals mains adaptor U.D.G. software blank micro tage £320,00 021 427 8865. MAILSHOT, A mailing label program for the Dragon 32 'Prints address labels from Printer' to: P. Perris 88 Poplar Crescent, Shipley, W. Yorks. BD18

TAPE RECORDER make Boots CR325 cost £30. Sell £12. Trans-Am, Lune Crabs, £2.50 each, Phone (0480) 65253. Ask for Richard

FOR SALE Curran Micro Speech for ZX Spectrum first offer around £23. Write to Gower, 4 Clyffard Crescent, Newport, Gwent,

MICRODRIVE without interface one for only £20, with 10 months guarantee. Ask for Richard, Can't deliver -- cen send Tel: (0480) 65253.

DIGITAL CIRCUIT DESIGN program for 48K Spectrum C8.00. Lords of Time and Adventure Quest (level 9) £5.00 each, David Hawkins, Reading 696094. SHARP MZ80K, 49K, high resolution, built-in monitor and casette, VGC. Ongirist manuals and software with books. listings, dustcover, first good offer laken, no software only offers. 01-889 1000 wher Spm.

A 40 CHANNEL CB including co-ak aenal power pack etc. Will swap for 16K or 48K Spectrum or will sell for £50 ono. Phone 725833 after 6pm (Medway). 48K ORIC-1 with over £60 worth of the best software, including Forth, a barpain at £90 100% reliable tape recorder £32 Write to C. Price, 55 Gralgola Road, Glais, Swansea, SA7 9HS 100 BLANK CASSETTES with library case, new and unused. Now not nee

ded. C.S load for any computer. \$17.50 post paid. Will spirt. Tel: 0633 700974 after Born OL-AH SERIES, 10LUG newsletters.

Dongle Free, £380 ono, Tel: 01-578 77/34

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OIC PRINTER 8.5 CPC, Ideal for listing and WP 195 Tot: 021 443 4783 (eves). ORIC 1 48K for sale + Hobbil, Harrier Attack, Centipede, books, Curly £99. Boxed Very good condition. Tel: 01-440 3263

MICRODRIVE AND INTERFACE, four cartridges, Trans-Express copy Utility, Melbourno House Microdrive book, all mint and boxed, £100,00 one. Consider part exchange for CBM64, with cassette. Call Bill, Matlock 4371 VECTREX VIDEO game unit, with in-

### COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fift in the accompanying form and send to Computer Swap Popular Companing Weekly, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-437 4343

All software offered through computer swap must be in original condition and for private sale

It cannot be swapped. Warning: It is inegal to advertise pirated software

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built screen, plus two games, and light pen + pollware. Cost £185, sell for £80 ono. Phone 01-540 9389 after 8pm (London SW20).

### Wanted

WANTED PROGRAMMABLE INTER-FACE with or without joystick also keyboard for Spectrum. Must be cheap. Ring 0742, 613876.

WANTED VIDEO Geni interface. W living. Tel: 0380 812596.

SWAP ORIC 1 48K - E80 of s/w + books and games for 48K Spectrum. Tel: 0734 595411 ewl 285 Mr Gealer. WANTED FULLER soundbox demo tape, also wanted any Spectrum magazines. Tel: 068641 375 after 5 on.

WANTED SINCLAIR microlines (interface not required.) Must be in good condition. Also consider any micro drive cartridges full or not. Tel: 01-683 1038. Offers after 6cm.

I WOULD LIKE some one iii be my pengal All letters answered. Write aoon. Golin Edwards. 33 Arodone Road, London SW2 280. England.

WANTER PRINTER for Dragon 84 Centronics or RS232. Will swap best offered for Omnicord Synthesiser Full Rhythm section, auto cording. New to box with P.S.U. cost £175 (unwanted present) (0243) 826012

WANTED 32K Ram for 16K Spectrum Will pay reasonable price. Must be working order. Calne 815491. Ring Calne (0249) 815491 evenings.

WANTED NON-WORKING Dragon, Spectrum, Vic20 or Petin any condition. Phone 036287-327

SWAP DRAGON 32 E110 a/w for 48k Spectrum (no software needed) or self for \$90. Contact Anthony at Stration (0761) 232258 evenings.

WANTED SPECTRUM 48k in working condition £50 or Spectrum 48k and microdrive £90. Willing to negotiate. Phone 0708 854745 (Paul).

WANTED COMMUNICATION software to run modern from Dragon 32 Maptin serial interface or from Dragon 64. Please phone 01-821 1710 sites

WANTED EX. BASIC for Tig9-4A also any other hardware or software. Dolais please to Ken Llangem 724636 N.

SPECTRUM 48K wanted will awap my AK1A HX-3 stereo cesselle deck new (unwanted gift). Cost £100 phone Freddy 0346 24994/24208.

FOR SALE OR swap. 2 books, Programming your ZX Spectrum and Games ZX Computers Play £7.00 one. Please ring 0282 68646 and ask for Public.

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WANTED ANY ZX81 software or histoware. Will exchange for Spectrum-Hunter Killer and Ship Of Line or will bus. Tel: 0279 445204.

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WANTED DRIC 1 5.25in. Disc drive and D.O.S. or any help to achieve it. Phone Blackpool (0253) 49493 Kevan

WANTED TO BUY software for BBC Dragon or Spectrum. Phone 09285 80635 Sundays only.

BWAP MY QUICKSHOT 11 for Kempston 5000 or Suncom Tac 2. Write to Stephen at 35 Elstead Road, West Vale, Kirkby, Liverpool L32 4TE.

WANTED MZ80K exp. 60x MZ8010 for sale — cord coupler £75. Ring John on 021-551-6427.

### ADVENTURE HELPLINE

The Behhit on Spectrum. Once through the wine cellar, how do you find lake town and 'bard'? where is the key for the mountainside door? John Osbourne, 28 Edwin Avenue, Woodbridge, Suffelt.

Voodeo Castle on RBC. How do you get the ju-ju bag? Jason Wright, 90 Carter Drive, Collier Row, Romford, Essex.

Adventuraland on Vio20. I am stuck at the royal chamber. When you say Help it says Blow it up. Blow what up??? Maithew Pooler, 18 Johnstone Close, Wrockwadine Wood, Telford, Shropahire.

Countdown to Doots on SEC. How do I get past the robot in the screen of light? John Seman, 5 Church Lane, Elvington, N Yorks.

Skip of Doom on Spectrum. I cannot get the key from the glass cover or release the body from the ice. Any clues please? Jay Pannett, 3 Forest View, Hailsham, Sussex. Espicacye Leland and Golden. Apple on Spectrum. I cannot get past the tank in the first and the crocodile in the second. Andrew Cameron, S1 Backwoods Lane, Lindfield, W Sussex.

Tembs of Xeiops on Commodore 64. How do I get pas the keeper of

the tombs—I have been everywhere else and my score is only 57 out of 100? Is the pyramid of any use? S P Lotterill, 38 Barnet Road, Socialand Green, Erdington, Birmundham.

Chross on Atari. How do I get shot from the cannon without getting tilled? Graig Hornby, 12 Penychent Avenue, Burnhdare, York. Issue Carse On Spectrum. How do I get past the sand dungeon? R Foster, 67 Bushfield Road, Wathon-Dearne, Rotherham, S Yorkz. Bebbit os Spectrum. How do I get the goblin's ring and how do I get across the last black river? Scott Fountain, 6 Abinger Road, Pokesdown, Bournerrouth.

Zork I on Commoders 64. How do I get the coffin out of the temple? How do I move the platinum bar? How do I use the cage in the shah? Brendan Bradley, 54 Ashwood Road, Clondalkin, Co Dublin, ireland.

Mobbit on Commodore \$4.1 cannot take the treasure. Richard Howlett, 9 Avendale road, South Benfleet, Essex.

**Mobbit on Spectrum.** How do you get away from the Elf clearing into the elf kingdom? Nicholas Metcalfe, 34 Crossmead, Eltham, London SE9.

Pyramid of Deom on TIP94A. I cannot get into the pyramid. Can you help? Paul Jeffrey, 31 Pinetrees, Weston Favell. Morthampion.

Colditz Adventure on RBC. Having escaped from the castel ! carnot find the map to abow the way to freedom. David Onimn, 35 Longhill Avenue, Ayr, Ayrahire, Scotland.

Hahhit on Commodere 64. I am trapped in the goblins dungeon. I have found the key and I have the sword, the rope, the golden key, the map and the curious key. Chris Barnes, 19 Scafwell Way, Chifton, Nottnorham.

Bobbit on Spectrum. How do I eacape from the goblins dungeon? How do I escape down the river from the elevenkings halls? James Hazlam, 6 Stitingbourne Avenus, Bush Hill Park, Enfield, Mddx.

Valhalla on Spectrum. I cannot find Offir and I have had the program for three months now. Helpl Paul Waggert, 8 Lexton Drive, Churchtown, Southport, Merseyside.

Curse of the Werewolf on Vicio. How do you get into the castle that is guarded by the zomble. Guy Cuffe-Jones, 28 Somerset Road, Edgebaston, Birmingham.

Mobbit on Commodore 64. Terrible to admit but I cannot get beyond 78% of the adventure. Help please. D A Sidey, 11 Romfey Close, Basingstoke, Harits.

Franklin's Tomb on Dragon. I am stuck with the cave system which I cannot get out of. Charles Beighton, 25 Penland Road, Haywards Heath, West Sussex

Diary

Same.	<u>Pates</u>	Topic	Administra	Organisem
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(Figures compiled by Boots' Webstern)

### SCREEN MAPS

On first impressions, the Spectrum Advanced User Guide is clearly set out and comprehensible, with decent type and a goodly weight. Luckily, reading confirms these impres-STORE

The first third of the book is a Besic reference section, listing every command alphabetically, each with its own page. Next comes a very good memory map and a screen map.... things which are usually inadequate or unobtainable.

There is extensive information about machine code. which also includes a short introduction to this field.

Many Rom routines are listed, not only for the 'stand alone' Spectrum, but also for the microdrives. RS232 interface, network port and ZX printer, allowing all the peripherals to be successfully accessed via m/c. The book manages to include so much because it really is aimed at the advanced.

The only useful thing I can think of that has not been included is the Spectrum characier set.

Overall, the book comes out with flying colours.

The Spectrum Advanced User Guide

Authors Adrian Dickens, Mark Phimbley, Leycester Whewell

Supplier Adder Publishing, PO Box 148, Cambridge, CB1 2EQ.

### ABSTRACT

Purchasers of expensive business systems expect full support in choosing programs: this book provides similar advice for small-business people who use the BBC B.

covers a range of applications, from accounts w word processors (even a bar code reader), and touches on hardware expansion, including the Torch Disk Pack.

Each topic is discussed in the abstract, indicating what questions to ask about any program type, before specific examples are candidly reviewed, with illustrations.

It is realistic about the expectations and limitations of the machine and should prove invaluable for the newcomer who has just purchased, or is considering, a BBC micro.

Rook **Business Applications** on the BBC Micro Price 67.95 Micro BBC Supplier Graneda Publishing, 8

Grafton St. London WIX 3LA

# This Week

Program	Type	Micro	Price	Supplier
Raily Driver	Arc	Aquarkus	£4.96	Micro Mart
Scremble	Arg	Aquarlus	\$4.95	Micro Mart
The Megic Sword	Ad	BBC	€8.95	Dalabase
Datagem	ijt -	BBC	€129.95	<b>BBC</b>
Ertk the Viking	Att	Commodore 64	£9.95	Mozaic
Sheriock	Ad	Commodore 64	\$8.95	Melbourne House
The Named of Time	Ad	Commodore 64	29.95	Mozaic
The Pettigrew				
Chronicies	Ad	Commodore 64	£9.95	Shards
BMX	Arc	Commodore 64	57.99	Jetsoft
California Gold Rusi	hArc	Commodore 64	\$2.99	Spectrum
Cavelon II	Arc	Commodore 64	£7.98	Jetsoit
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Calculator	Mile .	Commodore 64	€14.99	Kuma
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Witchswitch	Arc	Commodore 84	17,95	English
CHR\$	Ut.	Commodore 64	£4.95	Miro Mart
Gala File	UI	Commodore 64	£7.95	Gala Solt
Blockbuster Quiz	Ut	Dragon	25.50	Computerwise
Darts	S	Dragon	€5.50	Computerwise
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Galilon	Ad	Soectrum	25.95	Shards

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Chronicies	Ad Spectrum	E9.85 3	Shards
Flip Flap	Arc Spectrum	£2.99	Software Projects
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Freex	Arc Spectrum	\$2.99	Software Projects
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Sub Hunter	Spectrum	£6.95	Viero Mart
Friendly Face 2	Ut Spectrum	€6.95	Monttor
Milicro Draw	Ut Spectrum	24.95	Micro Mart

Kary: Ad -- adventura Arc -- arcade/Ed -- education S - strategy-simulation/Ut - utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD

The Pettigrow

# New Releases

### PICTURE SHOW

Projector I is a clever idea from McGraw Hill, designed for schools and businesses who want to display a series of graphics, graphs and other information.

The program contains not only graph drawing routines of various sorts, but also a choice of font styles. Having created a number of screens they can be presented in any order, with the delay between screens selected in advance or operated manually.

You can use the program very much like a slide projeclor, moving back and forth from picture | picture, returning to any particular one as often as you wish.

Program Projector I £9.95 Price Micro Spectrum Supplier McGraw Hill

Shoppenhangers Road Maidenhead Borkshire SL6 2QL

### WITTY

Mozaic should probably be credited with starting the idea of bookware, where linked books and software are packaged together, although, its first efforts were pretty disappointing. With The Stainless Steel Rat saves the World, things are looking up.

This time you get a pretty sophisticated machine code, graphically illustrated adventure in which you play James di Griz, the stainless steel rat. The



strength of the book (for me anyway) is in the sharpness and wit of the writing; thankfully, the adventure too does not take uself too seriously.

There is a vocabulary of 200 words and the graphics are pretty good, although language analysis a simple verb, noun. Since much of the plot involves travelling through time, the first problem is to find the time helix and work out how to manipulate its four properties of spin. flux, resonance and phase needless to say, I didn't get anywhere at all

The worst that could be said of the program is that it lacks anything really new - the best that a captures the flavour of the book well and should keep Tony Bridge in latters for a good few months.

Program The Stautiess Steel Ret Saves The World

Price £9,95

Commodore **Supplier** Mozaic 187 Upper Street Landon NI 18O

### DRAUGHTS



Superior Software has been fairly successful at producing BBC games - the company has now introduced a range of Commodore 64 material including, strangely perhaps, given the number of similar packages, Chess and Draughts.

Chess is one of those things that computers can do so superbly well (theoretically) that they cannot fail to win. Still, any sensible program is going to make sure you can avoid this inevitable alternative.

the week

### POT-POURRI

I always wonder about multiplayer games on computers. For some social or ergonomic reaction, computers seem best suited for solo activities and I wonder whether multi-player games ever do well has anyone ever seen one in any of the charts?

The above, of course, has nothing to do with any inherent failure on the part of the games. The Prince would seem to be excellent - in any event it won

The Prince is for four players and is a veritiable pot-pourri of Machiavellian machinations between player and player, and player and machine. The objective is to become master of the Lore - chief bureaucrat to the Prince and all round power wielder. This is accomplished by discovering and presenting the appropriate tokens of succession.

The four players represent a landowner, a cleric, and merchant and a tipstaff, and are respectively named Grasper. Ambrose, Porcus and Fernado (some evidence of political bias revelled here. I think Margaret). Each role has inherent advantages, eg. Porcus dispenses money.

The actual game consists of each player taking turns buying and selling, using spies, vio-



lence and bribery to discover the whereabouts of each token. The castle can be searched as in a conventional adventure. moving around and using words like Look, Examine and Take to see what's there.

It's devious and enormous fun - I hope that there are enough computer owners with three friends out there to do it justice. Oh yeah, it has nice graphics too.

Program The Prince Price Milcro Spectrum Cases Computer Supplier Simulations 14 Langton Way Landon SE3 7TL

Draughts allows you a variety of different options - next worse move, take back, play best move, etc. and will play at a variety of levels and speeds. One useful option for those who find the level of speed they have set is too slow is a 'play immediately' command which forces the computer to

If you want draughts for your Commodore 64 this one would seem to have all the features you could need.

Program Draughts Price Micro

£7.95 Commodore Supplier Superior Software Regent House Skinner Lane Loods LS7 IAX

### CHEAP

Now this is a very good idea a range of Quilled adventures for a mere £1.75; not only that, but the various titles are coded so that you can get an idea of the degree of difficulty of each adventure before you start. Each adventure is divided into two sections; side one outlines the story and gives you some hints, side two is the game

Faerie is described as of advanced level and is the only one of the first crop of six adventures to follow the traditional dungeons, dragons and elvish path. Nevertheless, it has much to recommend it. For one thing it manages to be both

# New Releases

surreal in plot but logical in terms of commundam solving at the same time.

There is a sort of dreamish air about Facrie, with an anra of innocence about it too. Snowmen, caves, granite chess pieces and magic circles all feature in the game and it is excellent. Nor are these Eighth Day adventures one day wonders; the cheat sheet on Faerie extends to three pages and I'm not going to give you a single chie.

Program Fassie £1.75 Price Spectrum Micro Eighth Day Software Supplier 18 Flaxbull Monston Wirrel Marsevaide L48 7UH

### **CAVEMAN**

Fire Ouest is another one of those games which describes itself as more than an arcade game having adventure overtones. What it is is a multiscreen arcade game which has overtones of Horace and the Spiders and, more particularly, Uah!

Ugh! was an excellent arcade game involving a cave-



man collecting eggs: Fire Ovest continues the caveman's adventures in search of fire over seven different adventures. All involve dodging things, mostly spiders and fireballs, climbing things (ladders) and swinging across vast gulfs.

It's all about fast reactions so is definitely for arcade, rather than adventure, fans - still, at least it doesn't include aliens. If you get past the final screen, there's a prize; what greater motivation do you need?

Program Fire Quest £9.95 Price Commodore 64 Micro Supplier The Edge 31 Maiden Lane Covert Garden London WC2

### VIKING SAGA

The Seas of Erik the Viking is the latest of Mozaic's bookware packages - the original book by Terry Jones now has an adventure game based on it written for Mozaic by Level 9. Level 9 have produced a fairly compulsive graphic adventure with versions for the Spectrum. BBC and Commodore 64.

Obviously the various versions will have slightly different characteristics - the Commodore 64 edition took ages to draw its pictures, but that may not be true of the Spectrum version.

The graphics are pretty good, and more importantly perhaps, they have a sort of style - the Viking farm not only looks pretty but also looks vacuely like how you'd think such a farm would look.

As it is by Level 9 the adventure itself is pretty devious; although it sticks to basic verb noun entry, there is much to explore and within the first few screens. Enough connundrums are introduced to keep it all interesting. I was really chuffed that I managed to solve one of them which is to do with some footprints ...

Program The Saga of Erth the Viland Price £9.95 Commodore 64 Milero Supplier Mozaic John Wiley & Sons Baffins Lane, Chichester

### SEQUEL

Sussex PO19 (uD)

Pitfall has a secual and it's called Pitfall II. Pitfall Harry. hero and adventurer, returns again to do battle and swim. jump, climb and run his way through the usual sprites.

The object of the game is to move Harry around various screens looking for his niece, the Raj diamond and a treacherous cat called Onickclaw, as a



honus there are 28 bars of gold to collect.

There are a large number of different screens with ropes to swing on, pits to avoid, rivers to swim with nasty fish and platforms to run along. If you liked the first one, you're sure to like

Program Pitfall II £9.99 Price Commodore 64 Micro Supplier Activision CGL House Coldings Hill Loughton Fecor

### CUTHBERT

Cuthert rears his bespectacled head yet again in Cuthert enters the Tombs of Doom - for the Commodore 64. This one falls into the category of 'complicated arcade game' as you try to find your way (well, Cuthert does) around over 200 rooms in which lurk nasty things, clues, chests to be opened and so on.

Cuthert & equipped only with the Ray of Ra which lets him zap at the more feeble ghosts but mostly its better to keep him out of their way () know how they feel). You can guess that with a couple of hundred locations there's going to be a sense of deja vu about them, but even so there is a variety

The packaging is particularly nice - you get a neat little manual that gives you a few hints on how to master the first few sections and even has a map of the first 40 rooms. There is, inevitably perhaps, a prize at the end. One of the best Microdeal games in a while and reasonably priced too.

Program.

Cutherbert enters the Tombs of Doom Price £6.96 Commodore 54 Micro Sapplier Microdeal

Truro Road, St Austall Comwall PL28 SIE

### UNORIGINAL

Rocket Roger is the sort of game title that makes my heart sink - you just know that the game concept will be boring and unoriginal, the programming technically professional but lacking real inspiration and the damn thing will sell by the sackfull.

Anyway, Rocket Roger has to walk run, jump and (it says here) thrust his way around the many caverus of an unknown planet. The idea | collect vital power crystals and fight off the usual baddies.

It is, of course, Manic Miner again except that there's far less wit and far less inspiration if you want your 127th version of MM then this is the program for you



Program Rocket Roger Price £7.95 Commodore 64 Milero Alligata Supplier 1 Ozange Street Sheffield SI IDW

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases. Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.



### Chance confusion

Probably probability is one of the most confusing, and confused, topics around. Take poor Prince Harry, napples and all so much depended upon him, because "If the Princess of Wales' second child is a girl, she'll complete a pattern of births which beats almost astronomical odds — about one in 65,000 to be precise" (Parents magazine, October 1884).

Of course what Parants forget to tell you is that, if the second baby was a boy, then the odds on that pattern of births was also about one in 65536.

The odds on any pattern of III births is 2<sup>16</sup>, be the child male or female. The actual probability that any child is male (or female), regardless of any previous pattern or history is approximately one in two.

Given the past history of royal birth presented in the article, the odds on the second child being a boy were 11 to eight — the second child was more likely to be a boy.

The second child was more likely to be a boy if the present birth was related to provious royal births (royal genes?). And, if not, boy or giri is equally likely.

Examples abound of similar confusions in probability, where the confusion is between what happens by chance, and the sense we make from a sequence. Any sequence of 16 births is as likely as any other, though it may be interesting that first-born were all boys, and the second born were all girls (until Harry).

Take a rather less regal example. In a magazine there are eight reviews, for example, and two of the reviews are by the same person, call him/her X (the other six reviews are by six other people). There are 28 different combinations of two reviews; to choose any combination at random' means that each combination is as likely as any other to be chosen.

Therefore, of course, one is just as likely to choose two reviews by the same person as any other combination of reviews. To assert that a choice is not random because the two reviews are by the same person is a confusion on a par with that from Parents magazine. Randomness is a facet of the selection procedure, not of the result of the selection. Incidentally, the probability of choosing X as at least one of the two reviewers is 13 out of 28 (or almost one in two)—that is probably surprising.

If you had to bet on one of the two reviewers being X, good odds would be three to one (you argue that the odds of choosing an X review are two to six), but really the fair odds are 13 to 13. If you had to bet on one person appearing (at whatever odds) one would, of course, choose profific reviewer X. You are more likely to be wrong than right — but you are least likely to be wrong. X is the maximum likelihood estimate, in that if you have to guess, choose X, because it is the most likely single answer.

Generally speaking this is what expert systems in computers perform: an expert system is no more than a set of rules and probabilities, the outcome being the most probable solution, with possibly a series of less likely answers.

As we have seen, in the expert system to predict who has a review within the two chosen at random, the 'most libely' answer is often more likely to be wrong than right. However, of all the possible answers, it is least likely to be wrong.

Often, however, the decision from the expert system is also more likely to be right, rather than wrong. If a decision has to be made between a restricted range of causes of an illness, it is possible that the expert system can be very useful at predicting the appropriate cause. The success of such an expert system is difficult to assess, for an interesting reason.

If I have two points on a graph, I can always draw a straight (two dimensional) line through these two points. With these two points I can draw an infinity of flat (three dimensional) surfaces. If I have three points, I can draw one surface, but possibly no straight line, and the eatra point is a check on the line. If I have a large number of observations on fewer people, I can always be totally correct in my predictions.

This is why to assess the utility of an expert system, which by its nature is continually being modified to take into account new forms of information, the testing of the system has to take place over a wide variety and number of independent test cases.

Boris Allan

### Letter substitution

Puzzle No 130

Here are two alphanumerics in which digits have to be substituted for the letters.

(i) P \* (P \* C \* W) = PCW (ii) W \* (P \* C \* W) = PCW



There are no prizes to readers of this magazine for identifying what those letters usually mean—but here we are after the digital value of these expressions. There is one answer to the first alphametic, but three possibilities for the second. What are they?

### Solution to Puzzle No 125

Of the TITS different throws possible with five dice, 1811 of them will win. Thus the player will have slightly less than one winning throw in every four.

The program takes each throw in sequence and keeps count of winning and losing throws.

191ETT = 6:LETU = 8:29 FOR A = 1 TO 6:39 FOR B = 1 TO 6:49 FOR C = 1 TO 6:39 FOR B = 1 TO 6:39 FOR E = 1 TO 6:70 LETS = A : 8 + C + D + ESS LETF = A \* 8 \* C \*D \* 1:39 LETZ = PS : 100 FZ = ENT(Z) THEN LETT = T + 1 110 FZ <> ENT(Z) THEN LETU = U + 1 1:20 FERT ED.C.B.A. 130 FRENT T : 140 FRENT U : 150 FRENT T + U

### Winner of Puzzle No 125

The winner is Carol Huffman, Albany Ct, Brunswick Rd, Earledon, Coventry, (using a QL), who receives £10.

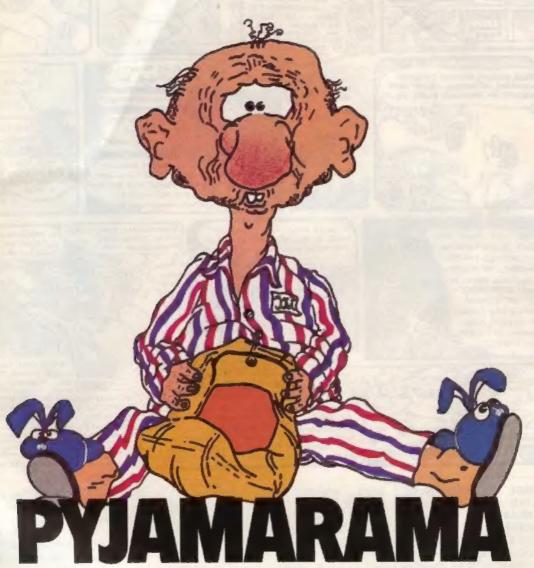
### Rules

If the puzzle prize can be sensibly solved using a computer, then the winner will have included a listing of the program used to find the correct answer. The closing date for entries to Puzzle No 130 is November 9.

### The Hackers



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